GARVIES' POINT REDEVELOPMENT
GLEN COVE, NEW YORK

PRE-CONSTRUCTION CONFIRMATORY/INSURANCE DATA GAP SUBSURFACE INVESTIGATION REPORT

PREPARED FOR:

RXR-Glen Isle Partners, LLC
625 RXR Plaza
Uniondale, NY 11556

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

James P. Rhodes, CPG, Senior Vice President jimr@pwgrosser.com
Derek Ersbak, Project Manager dereke@pwgrosser.com

PWGC Project Number: RGI 1401

MAY 2014

P.W. GROSSER CONSULTING, INC.
PROJECT No. RGI 1401

PRE-CONSTRUCTION CONFIRMATORY/INSURANCE DATA GAP SUBSURFACE INVESTIGATION REPORT

GARVIES' POINT REDEVELOPMENT
GLEN COVE, NEW YORK

PREPARED FOR:

RXR Glen Isle Partners, LLC
625 RXR Plaza
Uniondale, NY 11556

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716

PRE-CONSTRUCTION CONFIRMATORY/INSURANCE DATA GAP SUBSURFACE INVESTIGATION REPORT
GARVIES' POINT REDEVLOPMENT
GLEN COVE, NEW YORK

TABLE OF CONTENTS PAGE

FIGURES

TABLES

APPENDICES

PROJECT: Garvies' Point Redevelopment Project. The project included an investigation to document current subsurface conditions at the Garvies' Point Redevelopment site for the purposes of characterizing the site for subsequent insurance coverage and as a condition of closing on the property.

This form indicates the review and acceptance of the document listed below by a Certified Health Physicist.

THE FOLLOWING DOCUMENT HAS BEEN REVIEWED AND ACCEPTED:

- Pre-Construction Confirmatory / Insurance Data Gap Subsurface Investigation Report – Garvies' Point Redevelopment

PREPARED FOR:

RXR-Glen Isle Partners, LLC
625 RXR Plaza
Uniondale, New York 11556

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716

REVIEWED & ACCEPTED BY:

Dennis M. Quinn, CHP
3 Shadow Lane
Hopewell Junction, New York 12533

Dennis M. Quinn 5/13/14

Dennis M. Quinn, CHP Date

EXECUTIVE SUMMARY

A Pre-Construction Confirmatory / Insurance Data Gap Subsurface Investigation (SI) was performed at the Garvies' Point Redevelopment Site (Site) to confirm that existing conditions meet the Site Wide Cleanup Levels (SWCLs) in the Records of Decision (ROD) of the respective properties, and to address certain data gaps identified by the developer's environmental professionals so that appropriate insurance coverage can be obtained by the developer prior to acquisition of the property. The investigation included an evaluation of the Li Tungsten Parcels, Captains Cove Site, Angler's Club, Gladsky Site, and the roadways/right-of-ways between the Li Tungsten Parcels.

The foregoing investigation included installation of 233 soil borings and eleven test pits, field screening of soils, analysis of 633 soil samples, and the collection and analysis of 23 groundwater samples. The structurally unsound Lounge and Benbow Buildings prevented drilling through their foundation slabs. Therefore, the investigation of these areas was deferred until a later date after the buildings are demolished. The investigation also did not include an evaluation of creek sediments which was needed to investigate data gaps in reference to sediment quality for potential dredging operations and will be evaluated in a separate investigation. Apart from these items above, all insurance data gaps were addressed through this investigation.

The Angler's Club and Li Tungsten Parcel C', which had not been evaluated previously, were found to be acceptable for Restricted-Residential Use based upon subsurface soil quality.

The areas of known remaining soil impact above the water table on the Li Tungsten Parcels (including roadways and right-of-ways), Captain's Cove Site and Gladsky were confirmed to meet SWCLs and/or levels documented in the remedial action completion reports during the investigation with the exception of a few hotspots. However, it should be noted that Radiological screening and analysis and Volatile Organic Compound (VOC's) analysis did not exceed SWCLs throughout the Site. Although areas of visual petroleum staining were observed and Semi-Volatile Organic Compounds (SVOCs), metals, pesticides, or polychlorinated biphenyls (PCBs) content was greater than either SWCLs or Restricted Residential Soil Cleanup Objectives (RRSCOs) in some of the sampled locations, the results show that the properties, with a few exceptions, met the cleanup standards of their respective remedial action plans. Implementing the institutional and engineering controls in Site Management Plans (SMPs) at the Site, in the form of the existing approved SMP for the Ferry Terminal and Captain's Cove will result in conditions suitable for Restricted-Residential development as explained ahead.

A draft SMP for Li Tungsten was submitted to the Agencies August 2012, revised based on Agency comments and resubmitted February 2013. This draft has not yet been approved. However, the procedures in the approved Ferry Terminal SMP and the revised draft Li Tungsten and approved Captain's Cove SMPs were used to evaluate the findings. Using the SMP procedures the site will be made acceptable for Restricted-Residential use by:

1. Removing soil encountered during earthwork exceeding SWCLs on the Li Tungsten Site ;
2. Installing engineering controls listed in the SMP over undisturbed soil exceeding SWCLs not encountered during construction;
3. Installing soil vapor mitigation systems under all occupied buildings; and
4. Prohibiting groundwater use for all purposes.

Groundwater contamination was identified underlying the Site in several areas that can be attributed to up-gradient sources with documented contaminant plumes. An anomalous occurrence of groundwater with a petroleum signature was identified on the western portion of the Captain's Cove property. The origin of this detection is unknown. The source of the petroleum chemicals was not identified in the on-Site subsurface soils sampled in this area as part of this investigation. It is recommended that additional investigation be performed in order to determine if the source is on-Site and what, if any, corrective measures are required. Apart from this, the procedures in the SMP will mitigate potential impacts from groundwater contamination underlying the Site.

1.0 INTRODUCTION

P.W. Grosser Consulting, Inc. (PWGC) has prepared the following report to document the findings of the Pre-Construction Confirmatory / Insurance Data Gap SI. The work was conducted on behalf of RXR-Glen Isle Partners, LLC to confirm the current subsurface conditions prior to construction and address certain data gaps at the Site identified by the developer's environmental professionals.

The primary objective of this investigation was to confirm, prior to the developer taking ownership of the properties, that the condition of the properties is substantially the same as described in the appropriate final remedial documents prepared for the various properties. Additionally, as environmental insurance is a critical factor in property transfers with such environmental history, the need to address data gaps identified by the developer's environmental professionals are essential to the transfer process. Therefore, this report sets out to confirm, to the extent possible, the condition of the Site and to address, to the extent possible, the foregoing data gaps so that appropriate insurance coverage can be obtained at reasonable prices.

The investigation was performed in accordance with the New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), and United States Environmental Protection Agency (USEPA) approved, December 19, 2013, Pre-Construction Confirmatory / Data Gap SI Work Plan (**Appendix A**).

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 Site Location

The Site consists of multiple properties that fall under various environmental cleanup programs, e.g. federal and state Superfund sites and the municipal Brownfield Environmental Restoration Program (ERP). These sites have complicated hydrogeology and environmental histories that span several decades as described in the various remedial investigation reports that are in the public record at the Glen Cove Library. Remediation to satisfy the administrative records has been completed on all properties, except the 10 Garvies Point Road/Doxey Property, which is in the final stages of cleanup.

The Site is located along Herb Hill and Garvies Point Roads in Glen Cove, New York. The Site includes several parcels, all of which had environmental concerns as a result of past uses. These parcels include:

1. Li Tungsten
2. Captain's Cove
3. Anglers Club
4. Gladsky Property
5. Sewage Pumping Station
6. 10 Garvies Point Road/Doxey Property

In addition, there are several properties adjacent to the Site that contain environmental concerns that have the potential to impact the Site. These include:

1. Mattiace Petrochemical Federal Superfund Site
2. Crown Dykman New York State Superfund Site
3. Konica Minolta New York Spills Site

Figure 1 is a map depicting the Site, adjacent properties and the immediate vicinity. As the 10 Garvies Point Road/Doxey Property is still being remediated, it is not included in this investigation.

Information on the history of the properties and their remediation can be found in the reports held at Glen Cove Public Library, the public repository for documents relating to the Site investigations and remediation projects. The focus of this report is to compare the current conditions to the reported remediated conditions and to fill data gaps described previously.

2.1.1 *Li Tungsten Federal Superfund Site*

The Li Tungsten Site is located at 63 Herb Hill Road in Glen Cove. It is divided into three parcels, A, B, and C oriented on opposite sides of Herb Hill Road and Dickson Street as shown in **Figure 2**.

Li Tungsten – SWCLs

The USEPA evaluated the Site using SWCLs developed to be protective of human health and the environment for restricted residential use that were publicized in the 2005 Explanation of Significant Difference (ESD). They are:

PARAMETER	USEPA SWCLS
Arsenic	24 mg/Kg
Lead	400 mg/Kg
Thorium-230 + Thorium 232	≤5 pCi/g + background *
Radium-226 + Radium-228	≤5 pCi/g + background *
PCBs (Parcel B)	1 mg/Kg in the top 2 feet
PCBs (Parcel B)	10 mg/Kg below the top 2 feet

Notes:

mg/Kg = Parts per million (ppm)

pCi/g = picocuries/gram

*Background is approximately 1 pCi/g for each isotope

2.1.2 *Captain's Cove New York State Superfund Site*

The Captain's Cove Site (Captain's Cove) is located on the western end of Garvies' Point Road in Glen Cove, New York. It encompasses approximately 23 acres, including an estimated 4 acres of tidal wetlands along the site's southern boundary bordering Glen Cove Creek. Refer to **Figure 3** for a plan view of the different areas of the site.

The NYSDEC entered into an Administrative Order-on-Consent with the City of Glen Cove in March, 1997 for the City to implement a remedial investigation/feasibility study. A NYSDEC ROD was issued in March of 1999 indicating that the selected remedy for the site will consist of landfill excavation and reclamation and deed restriction. The NYSDEC utilized the Recommended Soil Cleanup Objectives (RSCOs) contained in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046 for the site at the time of the ROD. Another Administrative Order-on-Consent was issued in May of 1999 to include the remedial design and remedial action. A September 1999 EPA ROD for the Li Tungsten Site included a portion of the Captain's Cove Site identified as OUII. The USEPA evaluated the Site using SWCLs developed for Li Tungsten proper, as explained earlier.

2.1.3 *Gladsky Site*

The Gladsky Site is located on Garvies' Point Road, within the City of Glen Cove, New York. The site is owned by the City of Glen Cove. The approximately 0.8 acre site was utilized as a boat maintenance and repair facility and is bordered by Garvies Point Road to the north, Glen Cove Creek to the south, the Angler's Club to the west, and the Sewage Treatment Plant Pumping Station to the east. The Gladsky Site, along with the Angler's Club and the pumping station are all located on the same tax lot, Section 21, Block A, Lot 12. A site plan is illustrated on **Figure 4**.

The Gladsky Site is enrolled in the NYSDEC ERP. The Angler's Club and Sewage Pumping Station were included in the Phase 1 and Phase 2 studies at the beginning of the ERP program even though they were not part of the ERP,

but were not included in the remediation phase of the program during which only the former marina portion of the property was remediated.

2.1.4 *Angler's Club*

The Angler's Club is owned by the City of Glen Cove. The 0.9 acre site is utilized as a clubhouse and a marina. The Site is shown on **Figure 4**.

2.1.5 *Sewage Pumping Station*

The Sewage Pumping Station property is owned by the City of Glen Cove. However, the pumping station is owned by the Nassau County Department of Public Works (NCDPW). The approximately 0.2 acre site is utilized to pump municipal wastewater to the Sewage Treatment Plant located to the south, across the Glen Cove Creek. The Pumping Station is shown on **Figure 4**.

2.1.6 *Glen Cove Creek*

A March 2005 ESD added the Glen Cove Creek as Li Tungsten's OU IV due to radioactive ore residuals identified in the sediments in routine maintenance dredging conducted in September 2000. The ESD required removing the radioactive ore residuals through dredging and separation. The dredging restarted by the United States Army Corp of Engineers (USACE) in late 2006 and into 2007 after the administrative process to design the remedy was completed. The USEPA screened the spoils, separated the radioactive ore residuals and placed them in the Dickson Warehouse for disposal. Non-radiological dredge spoils were stockpiled on Parcel A for subsequent reuse or disposal.

The creek was dredged to a depth of 10-feet below mean low water, which is two feet deeper than the navigation depth. Hotspots, identified after the 10-ft deep dredging was done, were dredged another 1-foot deeper to insure that all radioactive material was removed to a depth where future dredging operations would not contact any residuals in the deeper sediments. Two radiological "hot spots" in the Creek area adjacent to Parcel A were left at the 11-foot depth and these may need to be addressed during future construction activities. However, as these hotspots are outside of the property boundary of the land being purchased from the City, they were not included in this investigation.

2.2 Environmental Summary and Insurance Data Gaps

A review of the available documents for the Site was performed by PWGC and the developer's environmental insurance broker in order to determine the current known environmental conditions of the Site and to identify potential data gaps in the available information. A summary of the review is included in **Table 1**.

3.0 PROPOSED REDEVELOPMENT

The Site is 56 acres in size that will include residential, commercial and retail space, a hotel and conference center, as well as open space and public amenities. The Phase I building construction will be in the eastern portion of the site along with a promenade, parks and other public amenities that will be constructed along the Glen Cove Creek bulkhead line for the entire length of the property. The first two residential buildings that will be built are designated as Block H and Block I. The build out will also include infrastructure and subsurface storm water storage/infiltration vaults and systems.

Reconstruction of Herb Hill Road and Garvies' Point Road will be done by the City concurrently with the Phase I development that will also include the reconstruction of the sewage pumping station and a replacement for the Angler's Club building to the east of its current location.

4.0 STANDARDS, CRITERIA, AND GUIDANCE (SCGS)

Based on previous investigations at the Site, the primary chemicals of potential concern (COPC) to be encountered are VOCs, SVOCs, metals, pesticides and PCBs. In addition, there is a potential radiological concern that may need to be addressed during the construction of the small boat marina on Parcel A of Li Tungsten.

The reuse standards applied to the remediation of the various properties varied according to the time that the RODs were issued and the programs governing the cleanups. Li Tungsten was under the federal Superfund Program and the reuse standards are risk based, whereas Captains Cove was under the NYS Superfund Program that used TAGM 4046 standards at that time. Gladsky used the RRSCOs as specified in NYSDEC 6 NYRR Part 375, which are the current standards used in NYS. In addition, the Captain's Cove and Li Tungsten reuse objectives were for a commercial not residential use.

The approved SMPs for Captain's Cove and the Ferry Terminal specify that Restricted-Residential use is permissible using the already approved cleanup with the addition of engineering and institutional controls. Therefore, the soil cleanup objectives in the RODs were used to confirm the current conditions and fill the data gaps, and the RRSCOs as specified in NYSDEC 6 NYCRR Part 375 were used to evaluate other constituents reported in the laboratory results. The USEPA risk assessment allowed for increased concentrations of arsenic (24 mg/kg), lead (400 mg/kg) and PCBs (10 mg/kg) in soils below the top two feet along with institutional controls for restricted–residential use for Parcels B and C. However, as Parcel A is the only Li Tungsten parcel that has a higher concentration of SVOCs than the other Li Tungsten parcels, USEPA required that engineering controls be added to this parcel for it to be approved for Restricted-Residential use, the approval of which is currently pending.

USEPA's Restricted-Residential use approval also included the following radiological cleanup levels:

PARAMETER	USEPA SWCLS
Thorium-230 + Thorium 232	≤5 pCi/g + background *
Radium-226 + Radium-228	≤5 pCi/g + background *

Notes:

pCi/g = picocuries/gram

*Background is approximately 1 pCi/g for each isotope

Groundwater sample results will be compared to the NYSDEC Class GA Ambient Water Quality Standards (AWQS) and Guidance Values (GV) as specified in the TOGS 1.1.1 and historical groundwater results.

5.0 PRECONSTRUCTION CONFIRMATORY/INSURANCE DATA GAP SUBSURFACE INVESTIGATION

The investigation was performed to collect the information and field data necessary to address certain identified data gaps and confirm presumed existing conditions prior to beginning Phase I construction activities. In addition, the investigation supported a geotechnical investigation by prescreening boring areas and test pits, characterized soil quality in the areas where utility and foundation excavations will occur, and characterized soil and groundwater quality in the vicinity of the roundabout at the intersection of Herb Hill and Garvies' Point Roads. The Scope of Work included the following tasks:

1. Geophysical Investigation
2. Confirmation of Radiological Site Background
3. Site Preparation
4. Test Pits
5. Subsurface Soil Characterization
6. Groundwater Characterization

The environmental data collected for the tasks listed above were used to characterize the current environmental conditions of the Site. In addition, RXR Glen Isle Partners, LLC conducted limited "verification" sampling in 2003 in accessible parts of remediated areas of the Site to confirm the status of those areas. The verification sampling identified elevated levels of SVOCs, arsenic and mercury in soils at various locations and varying depths. The USEPA radiological consultant accompanied RXR Glen Isle Partners, LLC during the field program to survey radioactivity at the sample locations, and no exceedances were detected. That data were also used in this investigation as explained ahead.

5.1 Geophysical Investigation

Historical records indicate that a condominium project was started and abandoned on the Captain's Cove Site. Following the project being abandoned by the developer, the City of Glenn Cove demolished the existing structures and may have left building foundations in place. In addition, a review of the remedial activities performed by USEPA and NYSDEC indicated that several areas of the Captain's Cove Site were not excavated. In order to determine the absence/presence of former building foundations and potential landfill wastes, a geophysical investigation was performed.

On November 13, 2013, PWGC and Advanced Geological Services (AGS) of Malverne, Pennsylvania mobilized to the Site to perform the geophysical survey. The survey was limited to the eastern portion of Captain's Cove where former building foundations were believed to be present. Descriptions of the geophysical methods are described below. Geophysical Investigation Results are included in **Appendix B**. Two anomalies were identified that required additional test pits to be included in the investigation. The anomalies proved to be concrete debris without any environmental issues, as explained ahead.

5.1.1 *Global Positioning System (GPS) Survey*

Prior to determining the locations of the subsurface anomalies, AGS utilized a backpack mounted Trimble global positioning system (GPS) unit to map out the area of concern. The GPS was utilized in order to create a more accurate map depicting the locations and sizes of the identified subsurface anomalies.

5.1.2 *Electromagnetic Survey*

Following the GPS survey, AGS utilized a Geonics EM-31 (EM-31) terrain conductivity electromagnetic (EM) instrument (in lieu of the split box metal detector). The EM-31 uses the principle of EM induction to measure the variability of electrical conductivity of subsurface materials and the presence of buried metal objects. Significant contrasts in the electrical properties between non-indigenous materials and surrounding soil enable accurate delineation of buried waste materials, fill, and geologic features. The large EM response to metal makes this technique particularly well suited to identifying buried metal objects such as USTs, metallic wastes, buried drums, pipelines, reinforced building foundations, and other metal components of buried structures. It is, however, equally sensitive to metal objects on the ground surface.

The Geonics EM-31 terrain conductivity instrument was used to conduct the first phase of the investigation. The EM-31 was used to detect both ferrous and non-ferrous metals buried in the upper 10 feet of the subsurface. AGS detected two conductive anomalies in the survey area that may be related to potential foundations or buried concrete materials. The anomalies are shown in **Figure 5**. Additional metal debris was identified throughout the Site.

5.1.3 *Ground Penetrating Radar (GPR) Survey*

Following the electromagnetic survey, AGS utilized a Geophysical Survey System SIR System 2 GPR imaging system and a 400 Megahertz (MHz) antenna to further investigate the metallic anomalies. The radar data was clear to only 3-4 feet below ground surface (bgs) and pertinent images of the EM anomalies could not be obtained.

5.2 Confirmation of Radiological Site Background / Instrument Calibration

5.2.1 *Instrument Calibration*

Prior to performing daily activities, field monitoring equipment was calibrated daily to insure accuracy and precision in the field. Daily calibration logs and field notes are included in **Appendix C**.

5.2.2 *Confirmation of Radiological Site Background*

Prior to performing the subsurface investigation, PWGC mobilized to the Site on January 13, 2014 with PermaFix® Environmental Services, Inc. (PES) of Knoxville, Tennessee to confirm radiological background. As detailed in the Radiation Monitoring Plan (RMP) (**Appendix A**), Site background was previously established on May 8, 2013 as 7,324 counts per minute (cpm).

PES performed a background check which included performing one minute static counts at three locations in the Garvies' Point Preserve where background was previously established. A Ludlum™ Model 2221 count-rate meter and scaler equipped with a 100 cm^3 (2" x 2") sodium iodide (NaI) detector was utilized which was determined to

be an acceptable alternative by PES to the Ludlum™ Model 12 count-rate meter and scaler equipped with a 44-9 frisker probe which was originally specified in the Radiation Monitoring Plan (**Appendix A**). This change in instruments was also approved by the Certified Health Physicist. The meter was standardized utilizing the accompanying cesium-137 check source (5µCi). The mean readings for the three locations were as follows:

1. 6,685 cpm
2. 6,741 cpm
3. 6,718 cpm

The average of the three locations is 6,715 cpm which is within 10% the original established background (8.3%) so the original two times background, 14,648 cpm, was utilized as the decision factor for soil screening purposes during the investigation.

5.3 Site Preparation

The Site has remained undeveloped for some time and much of the site has been overgrown with vegetation. In order to perform the work detailed below, Site preparation included clearing and grubbing of vegetative overgrowth and creating access paths to the drilling locations.

5.3.1 *Environmental Monitoring Protocol*

As clearing operations may have disturbed potentially impacted soils at the site, a protocol was established for invasive work which included the following:

- A radiological walkover survey/scan was completed over the area to be disturbed following the protocols established in the RMP. The survey consisted of screening of an area twenty feet by twenty feet centered on each area that was disturbed. At each survey location, a 100% scan was performed by PES using a Ludlum™ Model 2221 count-rate meter and scaler equipped with a 100 cm^3 (2" x 2") NaI detector. 100% scan is defined as walking at 0.5 meters/second and moving the probe in a serpentine motion. The technician walked one meter-wide lanes over each entire survey area.
- Community Air Monitoring was performed during intrusive work in accordance with the Community Air Monitoring Plan (CAMP) (**Appendix A**).
- A radiological walkover survey/scan was completed over the finished disturbed area.

This protocol is documented in the January 9, 2014 letter to the agencies and approved by the NYSDEC and USEPA in emails dated January 14, 2014 (**Appendix D**).

5.3.2 *Clearing and Grubbing / Access Roads*

Renato Grella Contracting Inc. (RGC) was retained to perform clearing/grubbing of the Site in the areas needed for access. Track mounted excavators were utilized to create access to the drilling locations. PES performed radiological walkover surveys/scans following the procedures detailed in Section 5.3.1 and PWGC performed community air monitoring during soil disturbance activities. Radiological screening did not identify any levels

above two times background in the walkover surveys performed over the disturbed areas. In addition, air monitoring levels were within acceptable levels. Daily air monitoring logs are included in **Appendix E**.

5.4 Test Pits

Test pits were performed to investigate the two anomalies identified during the geophysical investigation at Captain's Cove (CC-GI-001 and CC-GI-002). Additional test pits were performed to evaluate the design of several stormwater infiltration systems at the Site including five locations on Li Tungsten's Parcel A (LT-GI-001 through LT-GI-005), two locations on the Gladsky Site (GL-GI-001 and GL-GI-002) and two locations on the Angler's Club (AC-GI-001 and AC-GI-002). The locations of the test pits are shown on **Figure 6**. Test pits were excavated to a minimum depth of ten feet below ground surface, or until the groundwater table was encountered. Test pits followed the soil excavation protocols established in the Glen Cove Ferry Terminal SMP. RGC performed the test pit excavations utilizing a track mounted excavator, PES performed radiological screening, and PWGC performed environmental screening and community air monitoring.

5.4.1 *Radiological Walkover Survey/Scan*

Prior to the installation of each test pit, a radiological walkover survey/scan was completed following the procedures detailed in Section 5.3.1. Results of the walkover survey for each survey area were recorded on the test pit logs (**Appendix F**).

5.4.2 *Test Pit Protocol*

At each location, RGC utilized a track mounted excavator to perform the test pit. Prior to the excavation, 10-mil polyethylene sheeting, sufficiently large to hold the anticipated excavated soil was laid on the ground in the area where the excavated soil was placed. Each test pit was performed in two foot lifts and placed on the polyethylene sheeting in individual piles. NCDPW was onsite to observe the test pits installed to visually determine sediment permeability characteristics for infiltration. NCDPW did not require the use of water to evaluate infiltration.

During excavation, each two foot lift was characterized and screened for the following:

- Visual signs of staining or discoloration
    - Soils with staining or discoloration were not noted and were not segregated
- Volatile organic vapors utilizing a photo-ionization detector (PID)
    - Soils with elevated screening levels were not noted and were not segregated
- Metals utilizing a handheld XRF monitor
    - Arsenic levels above 24 mg/kg were segregated as detailed below
    - Lead levels above 400 mg/kg were not noted and were not segregated
- Radiation screening utilizing a radiation rate meter/scale
    - Counts above two times established background were not noted and were not segregated

The two foot lifts were placed on the 10-mil polyethylene sheeting in the order they came out of the ground. PWGC documented soil types, changes in lithology, and wastes (if any) encountered in the test pits. The two foot

lifts were screened with a Ludlum™ Model 2221 count-rate meter and scaler equipped with a 100 cm^3 (2" x 2") NaI detector. During monitoring, the detector was held approximately 3 inches or less above the surface being scanned. The detector was moved over the surface being scanned at a rate that did not exceed approximately 0.5 meters per second (m/s). The two foot lift was then screened for the presence of volatile organic vapors, which are commonly associated with petroleum products and industrial solvents, utilizing a PID. A five point composite of the lift was collected, homogenized and screened with the XRF for arsenic and lead readings. Characterization, photos, and screening results were recorded in a test pit log (**Appendix F**). Below is a description of the activities performed at each of the test pits.

5.4.3 *Test Pit Sampling Protocol*

In accordance with the approved Work Plan, a soil sample was collected from up to three intervals to evaluate soil quality in each test pit.

- Shallow Interval: 0-2 feet below ground surface or below the vegetative layer.
- Intermediate Interval: A two foot interval collected between 2 and 6 feet below ground surface. This interval was biased towards elevated screening levels that approached or exceeded the Soil Cleanup Action Level where observed.
- Deep Interval: A two foot interval collected between 6 and 12 feet below ground surface. This interval was biased towards elevated screening levels that approached or exceeded the Soil Cleanup Action Level where observed.

A total of five grab samples were collected from each sampled interval. The samples were placed into a stainless steel bowl and homogenized. Once homogenized, samples were transferred to laboratory supplied glassware and packed in a cooler with ice and shipped under proper chain-of-custody procedures to Test America, a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory, for analysis individually following NYSDEC Analytical Services Protocol (ASP) - Category B Deliverables. Soil samples were analyzed for the following:

- SVOCs by USEPA Method 8270
- Pesticides by USEPA Method 8081
- TAL Metals by USEPA Method 6010/7471

VOC analysis was not performed as there were no elevated PID readings observed in the soils screened from the test pits. In addition, none of the soil samples exceeded the radiation screening action level and none of the soil samples from the test pits were selected for radiation confirmation. Soil analytical results from the test pits are included in the soil boring analytical results discussion in Section 5.6.

5.4.4 *Test Pit Characterization*

LT-GI-001:

LT-GI-001 was installed in the northeast area of Parcel A on the eastern side of the staged dredge spoils. Medium to fine sands with gravel and some construction debris (cobble and concrete) were observed between 0 to 2

and 2 to 4 feet below grade surface (bgs). Fine to coarse sands were encountered from 4 to 6 feet bgs where the groundwater table was encountered. Screening levels were acceptable with the exception of arsenic at 31 ppm in the 4 to 6 feet bgs interval. This interval was temporarily stockpiled and covered with polyethylene sheeting and will be transferred into 55-gallon NYSDOT drums and staged onsite pending analysis. Soil samples were collected from 0 to 2 feet bgs and 4 to 6 feet bgs for analysis to assist in site characterization. The 4 to 6 foot interval was selected over the 2 to 4 foot interval to represent the intermediate interval based upon higher arsenic and lead screening levels.

LT-GI-002

LT-GI-002 was installed just south of LT-GI-001. Medium to fine sands with gravel and some construction debris (cobble and concrete) were observed between 0 to 2, 2 to 4, and 4 to 6 feet bgs. The groundwater table was encountered between 4 and 6 feet bgs. Screening levels were acceptable for each interval. Soil samples were collected from 0 to 2 feet bgs and 2 to 4 feet bgs for analysis to assist in site characterization. The 2 to 4 foot interval was selected over the 4 to 6 foot interval to represent the intermediate interval based upon higher arsenic and lead screening levels.

LT-GI-003

LT-GI-003 was installed on the western portion of Parcel A within the staged dredge spoil areas. Prior to performing the test pit, the dredge spoils were cleared following the protocols detailed in Section 5.3 down to the concrete slab. A demolition hammer was utilized to break through the concrete slab. Fine sands and silt with some construction debris (wood, concrete, and cobble) were observed between 0 and 2 feet bgs. The groundwater table was encountered at 2 feet bgs. Screening levels were acceptable for the interval. A soil sample was collected from 0 to 2 feet bgs for analysis to assist in site characterization.

LT-GI-004

LT-GI-004 was installed south of LT-GI-003 within the staged dredge spoil areas. Prior to performing the test pit, the dredge spoils were cleared following the protocols detailed in Section 5.3 down to the concrete slab. A demolition hammer was utilized to break through the concrete slab. Fine sands with and gravel were observed between 0 and 2 feet bgs. The groundwater table was encountered at 2 feet bgs. Screening levels were acceptable for the interval. A soil samples was collected from 0 to 2 feet bgs for analysis to assist in site characterization.

LT-GI-005

LT-GI-005 was installed west of LT-GI-003 and LT-GI-004 outside of the staged dredge spoil areas. Fine sands with silt and gravel were observed between 0 and 2 feet bgs. Fine to coarse sands with silt and gravel were observed between 2 and 4 feet bgs. The groundwater table was encountered between 2 and 4 feet bgs. Screening levels were acceptable for each interval. Soil samples were collected from 0 to 2 feet bgs and 2 to 4 feet bgs for analysis to assist in site characterization.

GL-GI-001

GL-GI-001 was installed on the east side of the Gladsky site. Medium-fine sands with trace gravel were observed from 0 to 2, 2 to 4 and 4 to 6 feet bgs. Medium-fine sands with some gravel and silt were observed between 6 to 8 and 8 to 10 feet bgs. The groundwater table was encountered at 10 feet bgs. Screening levels were acceptable for each interval. Soil samples were collected from 0 to 2 feet bgs, 4 to 6 feet bgs and 8 to 10 feet bgs for analysis to assist in site characterization. The 4 to 6 foot interval was selected to represent the intermediate interval and the 8 to 10 foot interval was selected to represent the deep interval since there was no significant arsenic or lead detections.

GL-GI-002

GL-GI-002 was installed on the west side of the Gladsky site. Medium-fine sands with trace gravel were observed from 0 to 2 and 2 to 4 feet bgs. Fine sands with some silt were observed between 4 to 6, 6 to 8, and 8 to 10 feet bgs. The groundwater table was encountered between 8 and 10 feet bgs. Screening levels were acceptable for each interval. Soil samples were collected from 0 to 2 feet bgs, 4 to 6 feet bgs and 8 to 10 feet bgs for analysis to assist in site characterization. The 4 to 6 foot interval was selected to represent the intermediate interval and the 8 to 10 foot interval was selected to represent the deep interval since there was no significant arsenic or lead detections.

AC-GI-001

AC-GI-001 was installed on the west side of the Angler's Club. Fine sands with trace silt and gravel were observed from 0 to 2 and 2 to 4 feet bgs. Fine sands with some silt and clay were observed between 4 and 6 feet bgs. The groundwater table was encountered between 4 to 6 feet bgs. Screening levels were acceptable for each interval. Soil samples were collected from 0 to 2 feet bgs and 4 to 6 feet bgs for analysis to assist in site characterization. The 4 to 6 foot interval was selected over the 2 to 4 foot interval to represent the intermediate interval based upon higher arsenic and lead screening levels.

AC-GI-002

AC-GI-002 was installed on the east side of the Angler's Club. Fine sands with silt and were observed from 0 to 2 feet bgs. Fine sands with some silt were observed between 2 to 4 and 4 to 6 feet bgs. The groundwater table was encountered between 4 and 6 feet bgs. Screening levels were acceptable for each interval. Soil samples were collected from 0 to 2 feet bgs and 4 to 6 feet bgs for analysis to assist in site characterization. The 4 to 6 foot interval was selected over the 2 to 4 foot interval to represent the intermediate interval based upon higher arsenic and lead screening levels.

CC-GI-001

CC-GI-001 was installed in the area of the geophysical anomaly in Captain's Cove identified as A-2. Medium-fine sands with silt and construction debris (brick, concrete and wood) were encountered from 0 to 2, 2 to 4, and 4 to

6 feet bgs. There were several large pieces of concrete observed, but formed building foundations were not encountered. The groundwater table was encountered between 4 and 6 feet. Soil samples were collected from 0 to 2 feet bgs and 2 to 4 feet bgs for analysis to assist in site characterization. The 2 to 4 foot interval was selected over the 4 to 6 foot interval to represent the intermediate interval based upon higher arsenic and lead screening levels.

CC-GI-002

CC-GI-002 was installed in the area of the geophysical anomaly in Captain's Cove identified as A-1. Medium-fine sands with silt and construction debris (brick, concrete and wood) were encountered from 0 to 2 and 2 to 4 feet bgs. Gravel was observed between 4 to 6 feet bgs. There were several large pieces of concrete observed, but formed building foundations were not encountered. The groundwater table was encountered between 4 and 6 feet. Soil samples were collected from 0 to 2 feet bgs and 2 to 4 feet bgs for analysis to assist in site characterization. The 2 to 4 foot interval was selected over the 4 to 6 foot interval to represent the intermediate interval based upon higher arsenic and lead screening levels.

5.4.5 *Backfill*

Following the completion of test pits, soils that did not fail the screening criteria were placed back in the excavations in the order they were removed. The 4 to 6 foot bgs interval from LT-GI-001 was not utilized for backfill since the screening level for arsenic was above the Soil Cleanup Action Level established for the site.

5.5 Subsurface Soil Sampling

PWGC and the developer's environmental professionals have identified several areas of the Site that needed further investigation to fill data gaps and several areas where exceedances were left in place whose boundaries needed to be confirmed. In order to determine the quality of soil in these areas and in areas of Phase I construction activities, soil borings were installed as shown on **Figures 7A, B,** and **C**. The soil borings were designated as follows:

Site Location – Type of Sample – Number

Site Location

- LT – Li Tungsten
- CC – Captains Cove
- GL – Gladsky
- AC – Anglers Club

Type of Sample

- C: Confirmation Boring: These borings were spread out across the Li Tungsten and Captain's Cove site in 100 foot grids to provide confirmation/insurance data gap coverage.

- G: Geotechnical Boring: These borings were installed ahead of the geotechnical borings to pre-screen and clear each location. Confirmation soil samples were collected from these borings in the locations which provided further confirmation/data gap coverage.
- GC: Visual Petroleum Staining Delineation Boring: These borings were installed to delineate the extent of visual petroleum impacted soils on Parcel A. Soil samples were not collected from these borings.
- GTBH: Geotechnical Bulkhead Boring: These borings were installed ahead of the geotechnical borings to pre-screen and clear each location Confirmation soil samples were collected from these borings in the locations which provided further confirmation/data gap coverage.
- R: Garvies' Point Road Boring: These borings were installed to evaluate soil quality that will be disturbed during the construction of the new roadway. Soil samples were collected to determine exposure levels of specific contaminants between 0 to 5 feet bgs and 5 to 10 feet bgs (Arsenic, Lead, and Radiation).
- T: TOGS Borings: These borings were installed on the south side of Parcel A, where the new marina and wetland will be constructed, to evaluate soil quality that will be removed during construction and the soil quality of the new marina basin as well as provide further confirmation/data gap coverage.
- X: Utility Boring: These borings were installed in the Dickson Street right of way to evaluate soil quality that will be disturbed during the installation of utilities. Soil samples were collected to determine exposure levels.
- XC: Utility/Confirmation Boring: These borings were installed on the Li Tungsten site to evaluate soil quality that will be disturbed for the installation of onsite utilities and to provide confirmation/data gap coverage.

5.5.1 *Radiological Walkover Survey/Scan*

Prior to the installation of each boring, a radiological walkover survey/scan was completed. The survey consisted of screening a ten foot by ten foot area centered on each boring. At each survey location, a 100% scan was performed by PES using a Ludlum™ Model 2221 count-rate meter and scaler equipped with a 100 cm^3 (2" x 2") NaI detector. 100% scan is defined as walking at 0.5 meters/second and moving the probe in a serpentine motion. The technician walked one meter-wide lanes over each entire survey area. Results of the walkover survey for each survey area were recorded on the soil boring logs (**Appendix G**). Screening levels did not exceed the two times background radiological screening action level.

5.5.2 *Geotechnical Soil Boring Protocol*

Craig Drilling Companies, Inc (CDC) of May Landing, New Jersey provided geotechnical drilling services during the investigation. A mud rotary drill rig was utilized to install the geotechnical soil borings. Prior to performing each soil boring, 10-mil polyethylene sheeting, sufficiently large to hold the anticipated number of soil cores was laid on the ground in the area where each soil boring was performed.

Geotechnical borings (LT-G-001 and LT-G-002) were installed utilizing mud rotary technology. CDC utilized 4 ¼ inch diameter hollow stem augers to install the geotechnical borings. Continuous split spoon samples were

collected at two foot intervals ahead of the augers to a depth of twenty feet to allow for environmental confirmation/data gap sampling. Following the completion of environmental confirmation/data gap sampling, the drilling mud was switched out and drilling was continued. After a depth of 20 feet, split spoons were collected at five foot intervals till the termination of the boring to evaluate soil conditions.

Screening of the split spoon samples was performed as follows for soil collected within the first twenty feet:

- Visual signs of staining or discoloration
  - Soils with staining or discoloration were not identified and were not segregated
- Volatile organic vapors utilizing a PID
  - Soils with elevated screening levels were not identified and were not segregated
- Metals utilizing a handheld XRF monitor
  - Arsenic levels above 24 mg/kg were not identified and were not segregated
  - Lead levels above 400 mg/kg were not identified and were not segregated
- Radiation screening utilizing a radiation rate meter/scale
  - Counts above two times established background were not identified and were not segregated

The soil screening method above was modified to only include volatile organic vapor screening after the boring reached twenty feet below land surface since only VOC groundwater impacts have been documented at deeper depths and the shallow soils are effectively sealed off with the use of the outer casing.

The split spoons were placed on the 10-mil polyethylene sheeting in the order they came out of the ground. PWGC documented soil types, changes in lithology, and wastes (if any) encountered in the split spoons. The split spoons were screened with a Ludlum™ Model 2221 count-rate meter and scaler equipped with a 100 cm^3 (2" x 2") NaI detector which was determined to be an acceptable alternative by PES to the Ludlum™ Model 12 count-rate meter and scaler equipped with a 44-9 frisker probe which was originally specified in the Radiation Monitoring Plan (**Appendix A**). The detector and the count rate meter detector were used to scan the top of each soil core in two foot intervals. The detector was held approximately 1 inch or less above the surface being scanned. The detector was moved over the surface being scanned at a rate not to exceed approximately 5 centimeters per second (cm/s). The split spoons were then screened for the presence of volatile organic vapors, which are commonly associated with petroleum products and industrial solvents, utilizing a PID. Following PID screening, the soils were homogenized and screened with the XRF for arsenic and lead readings. A soil boring log was developed for each location (**Appendix G**) and includes the characterization and screening data.

On January 24, 2014, an email request was sent to NYSDEC, NYSDOH, and USEPA to modify the geotechnical procedures detailed above. Due to extreme weather conditions, the mud was freezing in the lines of the geotechnical rig. In order to continue forward with the project, it was proposed to characterize the 0 to 12 foot interval at each geotechnical location utilizing the Geoprobe®. If contamination was encountered at the 12 foot depth, characterization would continue until adequately defined. As the top 12 feet will have been characterized, the geotechnical rig could focus on collecting geotechnical information. As the likelihood of finding contamination deeper than 12 feet was minimal, environmental screening and sampling would not be

performed. However, the CAMP would still be performed. The NYSDEC approved the procedural change in a January 27, 2014 email (**Appendix D**). The remainder of the geotechnical borings were installed following the environmental soil boring protocols.

5.5.3 *Environmental Soil Boring Protocol*

Associated Environmental Services, Ltd (AES) of Hauppauge, New York provided environmental drilling services during the investigation. A track mounted Geoprobe® direct-push drill rig was utilized to install the environmental soil borings. Prior to performing each soil boring, 10-mil polyethylene sheeting, sufficiently large to hold the anticipated number of soil cores was laid on the ground in the area where each soil boring was performed.

Soil borings were installed utilizing a Geoprobe® direct-push drill rig outfitted with a closed piston sampler and dedicated acetate liners. Soils were collected continuously from ground surface to an approximate depth of twelve feet below surface grade or to the water table, whichever was shallower.

The soil cores were placed on the 10-mil polyethylene sheeting in the order they came out of the ground. Prior to cutting open the acetate liners, the cores were screened with a Ludlum™ Model 2221 count-rate meter and scaler equipped with a 100 cm^3 (2" x 2") NaI detector which was determined to be an acceptable alternative by PES to the Ludlum™ Model 12 count-rate meter and scaler equipped with a 44-9 frisker probe which was originally specified in the Radiation Monitoring Plan (**Appendix A**). During monitoring, the detector was held approximately 1 inch or less above the surface being scanned. The detector was moved over the surface being scanned at a rate not to exceed approximately 5 cm/s. The readings were collected over two foot intervals and the mean was recorded. The acetate liners were then cut open and the soil core was screened for the presence of volatile organic vapors, which are commonly associated with petroleum products and industrial solvents, utilizing a PID. Following PID screening and sampling, the soils were homogenized and screened with the XRF for arsenic and lead readings. A soil boring log was developed for each location (**Appendix G**) and includes the characterization and screening data along with photo-documentation.

5.5.4 *Sampling Protocol*

Soil samples were collected from three intervals, where applicable, at the majority of the soil boring locations to evaluate soil quality.

- Shallow Interval: 0-2 feet below ground surface or below the vegetative layer.
- Intermediate Interval: A two foot interval collected between 2 and 6 feet below ground surface. This interval was biased towards elevated screening levels that approached or exceeded the Soil Cleanup Action Level where observed..
- Deep Interval: A two foot interval collected between 6 and 12 feet below ground surface. This interval was biased towards elevated screening levels that approached or exceeded the Soil Cleanup Action Level where observed.

Soil samples were analyzed for the following:

- SVOCs USEPA Method 8270

- Pesticides by USEPA Method 8081
- TAL Metals by USEPA Method 6010/7471
- PCBs by USEPA Method 8082 (Li Tungsten Parcel B Only)
- VOCs by USEPA Method 8260 (Limited to borings with elevated PID screening levels and to borings where the new marina in proposed) (Note: The new marina is proposed on the southern section of Parcel A)
    - Tera-core sampling devices were utilized for sample collection
    - Eight samples were analyzed for VOCs based upon elevated PID readings in the field
        - CC-C-051 (8-10'), LT-C-002 (2-4'), LT-C-024 (8-10'), LT-C-025 (6-8'), LT-C-047 (2-4'), LT-C-056 (4-6'), LT-C-056 (6-8') and LT-G-030 (0-2')
    - Twelve samples were analyzed for VOCs to evaluate the quality of sediment which will be located at the proposed marina bottom
        - LT-T-001 (10-12'), LT-T-002 (12-14'), LT-T-003 (10-12'), LT-T-004 (10-12'), LT-T-005 (16-19'), LT-T-006 (12-14'), LT-T-007 (14-16'), LT-T-008 (14-16'), LT-T-009 (12-14'), LT-T-010 (7-8.5'), LT-T-011 (6.5-8'), LT-T-012 (4-6')

Radiological screening did not identify any soil intervals above two times background. In order to confirm radiological screening results and provide data gap coverage, radiation confirmation sampling was performed on 5% of the total collected samples.

- Eight samples were collected from the Captain's Cove site to provide insurance data gap information and confirm field screening results.
    - Seven borings were positioned on the western portion of the site where the USEPA remediation was performed and one boring was positioned to the east side of the site.
- Six samples were collected from Li Tungsten Parcel A to provide insurance data gap information and confirm screening results.
- Two samples were collected from Li Tungsten Parcel B to confirm screening results.
- Two samples were collected from Li Tungsten Parcel Lower C to confirm screening results.
- Five samples were collected from Li Tungsten Parcel Upper C to provide insurance data gap information and confirm screening results.
    - Three samples were collected near the Benbow Building to evaluate current conditions. A historical endpoint sample adjacent to the Benbow Building was above its respective SWCL.
    - One sample was collected east of the Dickson Warehouse to confirm screening results.
    - One soil sample was collected beneath the Dickson Warehouse to provide insurance data gap information and confirm field screening results.

- Four soil samples were collected from Parcel C' to provide insurance data gap information and confirm field screening results.
- Samples were analyzed for Radium-226 and other gamma emitters by gamma spectroscopy (method GA-01-R) and for Isotopic Thorium and Uranium by alpha spectrometry (Method A-01-R).

Samples collected for volatile organic analysis were collected directly from the acetate liners utilizing tera-core sampling devices. The remaining sample volumes were transferred to a stainless steel bowl and homogenized. Once homogenized, samples were transferred to laboratory supplied glassware and packed in a cooler with ice and shipped under proper chain-of-custody procedures to Test America, a NYSDOH ELAP certified laboratory, for analysis individually following NYSDEC ASP - Category B Deliverables.

5.5.5 *Backfill and Restoration*

Following completion of each geotechnical boring, the borehole was sealed with a cement / bentonite grout mixture to surface grade. At the completion of each environmental soil boring, materials that were deemed acceptable for re-use were returned to the bore hole in the order removed.

5.6 Subsurface Soil Quality

As described previously, soil analytical results were compared to the standards in the ROD for each property and the chemicals not listed in the ROD were compared to NYSDEC Part 375 and CP-51 SCOs for Restricted-Residential Use.

5.6.1 *Garvies' Point Road Characterization*

Redevelopment plans for the Site include modification to the existing roadway to include a traffic circle at the Garvies' Point Road, Herb Hill Road, and Dickson Street Intersection. This redevelopment will include modifications to the existing roadway between Li Tungsten Parcel A and B and Lower C.

Three soil borings, LT-R-001 through LT-R-003, were installed to evaluate subsurface conditions that may be encountered during the construction of the new Garvies' Point Road for the redevelopment project. LT-R-001 was installed in Herb Hill Road between Parcel A and Parcel B, LT-R-002 was installed in Garvies' Point Road between Parcel A and Parcel Lower C, and LT-R-003 was installed in the northeast corner of Parcel Lower C. The location of the soil borings is shown on **Figure 7B** and represented as a solid green circle. Soil characterization was performed between 0 and 10 feet below surface grade and samples were collected for analysis of arsenic, lead, and radioactivity. Soil samples were collected from two intervals (0-5 feet bgs and 5-10 feet bgs) in each of the three borings. This protocol differed from the Work Plan as it was focused on evaluating the potential for exposure to known historical contaminants (arsenic, lead, radium, and thorium) by roadway workers based upon construction plans which include disturbance of the 0 to 5 foot bgs interval and the 5 to 10 foot bgs interval.

In general, soils were characterized as medium sands with silt and gravel. A clay layer was encountered from 8 to 10 feet bgs in LT-R-001. This layer was not encountered in the other two borings. Saturated soils indicating the

presence of the groundwater table were encountered at approximately six feet bgs in LT-R-003 (Elevation + 9.41 feet) and seven feet bgs in LT-R-001 (Elevation + 6.00 feet) and LT-R-002 (Elevation + 4.74 feet).

Soil Screening Results

Field screening identified levels of arsenic above 24 mg/kg in LT-R-002 (0-5') at 97 mg/kg, LT-R-002 (5-10') at 90 mg/kg, and LT-R-003 (5-10') at 60 mg/kg. No other field screening levels were exceeded.

Analytical Summary

Arsenic was detected above the SWCL value of 24 mg/kg in the 0-5 foot bgs sample (119 mg/kg) from LT-R-002 and the 5-10 foot bgs sample (145 mg/kg) from LT-R-003. These two locations showed elevated levels of arsenic with the XRF screening. However, the elevated arsenic observed with the XRF in the 5-10 foot bgs interval from LT-R-001 did not correlate with the analytical results (12.6 mg/kg). All other samples had concentrations of arsenic and lead below SWCLs.

Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in each of the road borings. The highest detections were observed in the soil collected from LT-R-001 which is located near the southeast corner of Parcel B.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.2 *Dickson Street Characterization*

Nine soil borings, LT-X-001 through LT-X-009, were installed to evaluate subsurface conditions that may be encountered during the installation of utilities in the Dickson Street right-of-way for the redevelopment project. The location of the soil borings is shown on **Figure 7A** and represented as a yellow circle and cross. Soil characterization was performed between 0 and 12 feet bgs and samples were collected following Section 5.5.4.

In general, soils were characterized as medium to fine sands with silt and gravel. A clay layer was encountered in several borings ranging in depths and thicknesses. Construction related debris (red brick) was encountered in one soil boring (LT-X-003) between 9 and 10 feet bgs. Saturated soils indicating the groundwater table were encountered between 7 to 10 feet.

Soil Screening Results

Field screening identified levels of arsenic above 24 mg/kg in LT-X-008 (8-10') at 64 mg/kg and LT-X-009 (0-2') at 42 mg/kg. No other screening levels were exceeded.

Analytical Summary

VOCs were not analyzed as elevated screening levels with the PID were not observed.

SVOCs, metals, and pesticides were within SWCLs and RRSCOs. The elevated arsenics observed with the XRF in the 8-10 foot bgs interval from LT-X-008 and 0-2 feet bgs interval from LT-X-009 did not correlate with the analytical results (1.3 mg/kg and 1.0 mg/kg).

One soil sample, LT-X-002 (6-8'), was selected for radiological confirmation analysis. This sample is located in the western right-of-way for Dickson Street in close vicinity to the Dickson Warehouse where radiological wastes were historically stored. Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in sample selected for analysis. **Figure 8** shows the locations of radiological confirmation samples and the Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.3 *Gladsky Site Characterization*

Two soil borings (GL-GTBH-001 and GL-GTBH-002) and two sediment permeability test pits (GL-GI-001 and GL-GI-002) were installed to evaluate subsurface conditions and provide lithologic information for the installation of drainage structures and the new bulkhead. The location of the soil borings and test pits are shown on **Figure 7B** and represented as a blue circle (GI) and a blue square with cross (GTBH). Soil characterization was performed between 0 and 12 feet bgs in accordance with procedures described in Section 5.4.2 for test pits and Section 5.5.3 for environmental soil borings. Soil samples were collected from the infiltration test pits following Section 5.5.4. Soil samples were not collected from the environmental soil borings since the test pits were sufficient to provide confirmation coverage of the site.

In general, soils were characterized as fine sands with trace amounts of silt and gravel. Saturated soil indicating the groundwater table was encountered at approximately 8 feet bgs.

Soil Screening Results

Field screening did not identify exceedances above action levels.

Analytical Summary

VOCs were not analyzed as elevated screening levels with the PID were not observed. In addition, samples were not analyzed for radiological confirmation as there was no historical radiological use on the site.

Metals and pesticide detections were below both SWCLs and NYSDEC RRSCOs.

Two SVOCs exceeded their respective NYDEC RRSCO value of 1,000 µg/kg in the 0-2 foot interval from test pit GL-GI-001 (benzo(a)anthracene at 1,100 µg/kg and benzo(b)fluoranthene at 1,500 µg/kg). SVOCs were not detected above SWCLs or NYSDEC RRSCOs in the deeper interval from test pit GL-GI-001 or from the three intervals from test pit GL-GI-002.

Soil analytical results are summarized in **Tables 8** through **10** and complete laboratory analytical reports are included in **Appendix H**.

5.6.4 *Angler's Club Characterization*

Two sediment permeability test pits (AC-GI-001 and AC-GI-002) were installed to evaluate subsurface conditions and provide lithologic information for the installation of drainage structures. The location of the test pits are shown

on **Figure 7B** and represented as a blue circle (GI). Soil characterization was performed between 0 and 6 feet bgs in accordance with the procedure described in Section 5.4.2 for test pits. Soil samples were collected from the infiltration test pits following Section 5.5.4.

In general, soils were characterized as fine sands with trace amounts of silt and gravel. Saturated soil indicating the groundwater table was encountered at approximately 4 feet bgs.

Soil Screening Results

Field screening did not identify any exceedances above action levels.

Analytical Summary

VOCs were not analyzed as elevated screening levels with the PID were not observed. In addition, samples were not analyzed for radiological confirmation as there was no historical radiological use on the site.

SVOCs, metals, and pesticides detections were below both SWCLs and NYSDEC RRSCOs.

Soil analytical results are summarized in **Tables 8** through **10** and complete laboratory analytical reports are included in **Appendix H**.

5.6.5 *Li Tungsten Site Characterization – Parcel A*

Sixty-three soil borings and five sediment permeability tests pits were installed on Parcel A as shown on **Figure 7B**. A description of the borings is detailed below:

- LT-C-030, LT-C-031, and LT-C-045 through LT-C-058: These sixteen soil borings were installed to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7B** as a pink circle with a cross.
- LT-G-019 through LT-G-027: These nine soil borings were installed ahead of the geotechnical borings to pre-screen and clear each location and to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7B** as a green circle with a cross.
- LT-GC-001 through LT-GC-008: These nine soil borings were performed to determine the extent of visually stained soil which was previously documented during the 2003 Glen Isle Verification Sampling in which three test pits showed visual signs of petroleum staining (PA2, PA12, and PA38). Soil samples were not collected from these borings as delineation was determined by visual observations. Borings are identified on **Figure 7B** as a green square with a cross.
- LT-GI-001 through LT-GI-005: These five test pits were installed to evaluate subsurface conditions and provide lithological information for the installation of drainage structures as well as provide confirmation/insurance data gap coverage. Test pits are identified on **Figure 7B** as a blue circle.
- LT-GTBH-001 through LT-GTBH-004. These four soil borings were installed ahead of the geotechnical borings to pre-screen and clear each location. Given their close proximity to existing confirmation/data

gap borings, soil samples were not collected for analysis. Borings are identified on **Figure 7B** as a blue square with a cross.

- LT-T-001 through LT-T-012: These twelve soil borings were installed to document quality of soil for the proposed marina and to provide confirmation/insurance data gap coverage. VOC analysis was added to the deepest sample interval which will represent the proposed future marina base from LT-T-001 through LT-T-012. Borings are identified on **Figure 7B** as a purple circle with a cross.
- LT-XC-013 through LT-XC-025: These thirteen soil borings were installed to document soil quality in the proposed location of utility runs as well as provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7B** as a blue circle with a cross.

Soil borings were not installed within the Lounge building since it was not structurally safe. Soil borings will be installed in the footprint of the building after demolition and results will be presented in an addendum to this report.

During the installation of soil borings, a concrete slab was encountered in the area of staged dredge spoils. Soil borings performed where dredge spoils are present were characterized from beneath the concrete slab. The dredge spoils were not included as part of the characterization. In general, soils were characterized as medium to fine sands with silt and trace gravel overlain by clay and bog layers. Construction related debris (brick, concrete, cobble, wood) were detected throughout the site. Saturated soils indicating the groundwater table were encountered between 2 feet bgs near the bulkhead and increased towards the north to 8 feet bgs.

Soil Screening Results

Radiological exceedances above two times background were not detected for the samples throughout Parcel A. In order to confirm radiological screening levels, nine soil samples from eight boring locations were collected and analyzed for radiological confirmation.

Elevated PID readings were observed in several borings including LT-C-047, LT-C-056, and LT-GC-003. Based on the screening results, LT-C-047 (2-4'), LT-C-056 (4-6') and LT-C-056 (6-8') were analyzed for VOCs. A sample was not collected from LT-GC-003 as it was installed to delineate the visual extent of petroleum staining only.

Arsenic concentrations above 24 mg/kg were observed in several borings including LT-GI-001, LT-XC-014, LT-XC-015, LT-XC-016, LT-XC-017, LT-XC-023, LT-XC-024, LT-C-047, LT-C-053, LT-C-056, LT-G-019, LT-G-025, LT-T-001, LT-T-002, LT-T-003, LT-T-004, LT-T-005, LT-T-009, LT-T-011, and LT-T-012 and lead concentrations above 400 mg/kg were observed in one boring (LT-T-006). Sampling intervals were biased towards these elevated detections.

Visual Petroleum Stained Soil Delineation

Verification sampling performed in 2003 identified the presence of visually petroleum stained subsurface soils at three test pit locations on Li Tungsten Parcel A (PA-2, PA-12, and PA-38). In order to delineate the horizontal extent, soil borings were installed around these locations to the extent possible based on site conditions.

Visual petroleum staining was identified at four soil borings within Parcel A locations including LT-C-056, LT-GTBH-002, LT-GC-003, and LT-GC-008. LT-C-056 was located west of PA-38 and is in close proximity to the Doxey site which is currently being remediated for petroleum issues, LT-GC-008 is located west of PA-12, LT-GC-003 is located north of PA-2 and LT-GTBH-002 is located in the middle of Parcel A towards the south. A map depicting the location of visually petroleum stained soils is included as **Figure 9**.

Analytical Summary

Two intervals (4-6' and 6-8') were collected from LT-C-056 based upon visual observations. VOC were detected above method detection limits (MDLs) in the three soil samples analyzed. The detected compounds were below NYSDEC RRSCOs. The detected compounds are commonly associated with petroleum products. Given the compounds and concentrations observed, the petroleum appears to be fairly weathered. One of the two locations was below the concrete slab in Parcel A (LT-C-047) where remediation was not performed.

SVOCs were detected above NYSDEC RRSCOs in several samples in Parcel A. Compounds detected above NYSDEC RRSCOs included Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, and Ideno(1,2,3-cd)pyrene. The highest total SVOC concentrations were observed in the 0 to 2 foot interval from LT-C-030 at 339,790 µg/kg. Detections above NYSDEC RRSCOs for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 10A, B,** and **C.** The water table was encountered at approximately 2 feet bgs on the southern section of Parcel A up to 8 feet bgs towards the northern section of Parcel A and many of the detections are located below the water table. The presence of SVOCs on Parcel A may be related to historical site operations including usage of petroleum storage tanks, burning of fossil fuels, and industrial operations. Several of the locations were below the concrete slab in Parcel A where remediation was not performed including LT-C-030 which contained the highest levels.

Arsenic was detected above the USEPA SWCL value of 24 mg/kg in several samples in Parcel A. The detections of arsenic were scattered throughout the site and were detected at varying depth intervals. The highest concentration of arsenic (327 mg/kg) was observed at the 2 to 4 foot interval in LT-C-047 which was in the saturated interval. Detections above the SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 11A, B,** and **C.** The water table was encountered at approximately 2 feet bgs on the southern section of Parcel A and up to 8 feet bgs towards the northern section of Parcel A and many of the detections are located below the water table. Several of the locations were below the concrete slab in Parcel A where remediation was not performed.

In addition to arsenic, lead was detected above its respective USEPA SWCL (400 mg/kg) in two samples, LT-G-022 (0-2') at 885 mg/kg and LT-GI-001 (4-6') at 893 mg/kg which was in the saturated interval. Detections above the SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 12A, B, and C.** LT-G-022 is located beneath the concrete slab in Parcel A where remediation was not performed. Aside from arsenic and lead, there were several detections of cadmium, copper and mercury above NYSDEC RRSCOs throughout the Parcel.

One pesticide, Dieldrin, was detected above its respective NYSDEC RRSCO (200 µg/kg) in the soil sample collected from LT-G-024 (0-2') at a concentration of 900 µg/kg. No other pesticides were detected above NYSDEC RRSCOs in Parcel A.

Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in each of the nine soil samples. The detected concentrations were fairly uniform across Parcel A. **Figure 8** shows the locations of radiological confirmation samples and the Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.6 *Li Tungsten Site Characterization – Parcel B*

Thirty-six soil borings were installed on Parcel B as shown on **Figure 7A**. A description of the borings is detailed below:

- LT-C-001, LT-C-028, LT-C-029, LT-C-060, LT-C-075 and LT-C-076. These six soil borings were installed to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7A** as a pink circle with a cross.
- LT-G-001 through LT-G-018: These eighteen soil borings were installed ahead of the geotechnical borings to pre-screen and clear each location and to provide confirmation/insurance data gap coverage. Samples were not collected from LT-G-002, LT-G-011, and LT-G-012 due to their proximity to other confirmation/data gap locations. Borings are identified on **Figure 7A** as a green circle with a cross.
- LT-XC-001 through LT-XC-012: These twelve soil borings were installed to document soil quality in the proposed location of utility runs as well as provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7A** as a blue circle with a cross.

In general, soils were characterized as medium to fine sands with silt and trace gravel overlain by clay. Construction related debris (brick, concrete, cobble, wood) were not observed in the soil cores. Saturated soils indicating the groundwater table were encountered at approximately 6 feet bgs in the southern portion of the Parcel and increased with depth to greater than 12 feet bgs to the north due to surface topography.

Soil Screening Results

Radiological exceedances above two times background were not detected for the samples throughout Parcel B. There were minimal historical radiological issues linked to Parcel B. However, in order to confirm radiological screening levels, the 6 to 8 foot interval from LT-C-060 was analyzed for radiological confirmation.

VOCs were not analyzed as elevated screening levels with the PID were not observed.

Arsenic concentrations above 24 mg/kg were observed in several borings including LT-XC-007, LT-XC-011, LT-C-060, LT-G-010, LT-G-015, and LT-G-016. Lead concentrations were not detected above 400 mg/kg. Sampling intervals were biased towards these elevated detections.

Analytical Summary

SVOCs were not detected above NYSDEC RRSCOs in Parcel B.

Arsenic and lead were not detected above their respective SWCLs in the samples analyzed. Arsenic levels observed with the XRF did not correlate with the analytical results. Cadmium was detected above its respective NYSDEC RRSCO (4.3 mg/kg) in the 0 to 2 foot interval from LT-G-005 at a concentration of 37.7 mg/kg. No other metals were detected above SWCLs or NYSDEC RRSCOs.

Two pesticides, Aldrin and Dieldrin, were detected above their respective NYSDEC RRSCOs in the soil sample collected from LT-XC-007 (0-2'). No other pesticides were detected above NYSDEC RRSCOs in Parcel B. LT-XC-007 is located along the eastern fence line of Parcel B adjacent to the Crown Dykman and Konica Minolta (Powers Chemco) sites.

PCB analysis was added to the soil samples collected from Parcel B after approval of the Work Plan as historical sampling had identified residual PCB impacts on Parcel B. PCB analytical results were compared to the SWCLs which are 1,000 µg/kg for the 0 to 2 foot interval and 10,000 µg/kg for soils below 2 feet bgs. The PCB, Aroclor 1248, was detected above its respective SWCL in the 0 to 2 foot soil intervals from LT-XC-007, LT-XC-009, LT-G-005, and LT-G-007. The highest concentration was detected at LT-XC-007 at 190,000 µg/kg. In addition, Aroclor 1260, was detected above its respective SWCL in the 0 to 2 foot soil interval from LT-G-007. Three of the four samples are located along the eastern fence line which is adjacent to the Crown Dykman and Konica Minolta (Powers Chemco) sites. No other PCBs were detected above SWCLs.

Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in LT-C-060. The detected concentrations were consistent with the values observed on Parcel A. **Figure 8** shows the locations of radiological confirmation samples and the Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.7 *Li Tungsten Site Characterization – Parcel Lower C*

Seven soil borings were installed on Parcel Lower C as shown on **Figure 7B**. A description of the borings is detailed below:

- LT-C-024 through LT-C-027, LT-C-032, LT-C-034, and LT-C-035. These eight soil borings were installed to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7B** as a pink circle with a cross.

In general, soils were characterized as medium to fine sands with silt and trace gravel overlain by clay and bog layers. Construction related debris (brick, concrete, cobble, wood) were not observed in the soil cores. Saturated soils indicating the groundwater table were encountered between 6 and 8 feet bgs.

Soil Screening Results

Radiological exceedances above two times background were not detected for the samples throughout Parcel Lower C. Radiological confirmation samples were not analyzed from these borings. However, a radiological confirmation analysis was performed on the Garvies' Point Road boring (LT-R-003) which was performed on the Parcel and discussed previously.

Elevated PID readings were observed in several borings including LT-C-024, and LT-C-025 which are in close proximity to the former above-ground storage tank (AST) located on the Parcel. Based on the screening results, LT-C-024 (8-10') and LT-C-025 (6-8') were analyzed for VOCs.

Arsenic concentrations above 24 mg/kg were observed in several borings including LT-C-024, LT-C-025, LT-C-027, LT-C-032, LT-C-034, and LT-C-035 and lead concentrations above 400 mg/kg were observed in several borings including LT-C-024 and LT-C-025. Sampling intervals were biased towards these elevated detections.

Visual Petroleum Stained Soil Delineation

Historical investigations had identified the presence of visual petroleum stained soils in the vicinity of the former AST which was located south of the Dickson Warehouse. As detailed above, visual signs of petroleum staining were identified in the two boring locations within Parcel Lower C nearest the former AST location. None of the borings surroundings these two showed signs of visual petroleum staining. A map depicting the location of visually petroleum stained soils is included as **Figure 9**.

Analytical Summary

VOC were detected above MDLs in the two soil samples analyzed. The detected compounds were below NYSDEC RRSCOs. The detected compounds are commonly associated with petroleum products. Given the compounds and concentrations observed, the petroleum appears to be fairly weathered.

Two SVOCs, Benzo(a)anthracene and Ideno(1,2,3-cd)pyrene, were detected above their respective NYSDEC RRSCOs in the 0 to 2 soil interval (unsaturated) from LT-C-026. No other SVOCs were detected above NYSDEC RRSCOs in Lower Parcel C. Detections above NYSDEC RRSCOs for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 10A, B,** and **C.**

Arsenic was detected above the SWCL value of 24 mg/kg in several samples in Parcel Lower C. The detections of arsenic were scattered throughout the site and were detected at varying depth intervals. The highest concentration of arsenic (581 mg/kg) was observed at the 2 to 4 foot interval in LT-C-024. Detections above the USEPA SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 11A, B,** and **C.**

Lead was detected above its respective SWCL (400 mg/kg) in one sample, LT-C-024 (2-4') at 4,480 mg/kg. Detections above the SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 12A, B,** and **C.** Aside from arsenic and lead, there was

one detection of cadmium at LT-C-034 (4-6') and copper at LT-C-035 (4-6') above NYSDEC RRSCOs in Parcel Lower C.

Pesticides were not detected above NYSDEC RRSCOs in Parcel Lower C.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.8 *Li Tungsten Site Characterization – Parcel Upper C*

Forty-six soil borings were installed on Parcel Upper C as shown on **Figure 7A**. A description of the borings is detailed below:

- LT-C-002 through LT-C-023, LT-C-036 through LT-C-044, LT-C-058, LT-C-059, LT-C-061, LT-C-063, and LT-C-069. These thirty-six soil borings were installed to provide confirmation/insurance data gap coverage. LT-C-059 was installed for the collection of groundwater only. Borings are identified on **Figure 7A** as a pink circle with a cross.
- LT-G-028 through LT-G-037: These ten soil borings were installed ahead of the geotechnical borings to pre-screen and clear each location and to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7A** as a green circle with a cross.

Soil borings LT-C-002 through LT-C-013 were installed through the concrete floor within the Dickson Warehouse which is located on Parcel Upper C. The rest of the borings were installed throughout the vacant portion of the parcel. Soil borings were not installed within the Benbow building since it was not structurally safe. Soil borings will be installed in the footprint of the building after demolition and results will be presented in an addendum to this report.

In general, soil was characterized as medium to fine sands with silt and trace gravels underlain by clayey sands. Construction related debris (brick, concrete, cobble, wood) were not observed in the soil cores. Saturated soils indicating the groundwater table were encountered at approximately 6 feet bgs in the southern portion of the Parcel and increased with depth greater than 12 feet bgs to the north due to surface topography.

Soil Screening Results

Radiological exceedances above two times background were not detected for the samples throughout Parcel Upper C. Previous investigations at the site had identified an elevated endpoint sample for radiological parameters adjacent to the Benbow Building. The soil beneath the Dickson Warehouse had never been tested before. In order to provide insurance data gap coverage and confirm radiological screening levels, five soil samples from four boring locations (three in the vicinity of the Benbow Building and one beneath the Dickson Warehouse) were collected and analyzed for radiological confirmation.

Elevated PID readings were observed in two borings including LT-C-002 and LT-G-030. Based on the screening results, LT-C-002 (2-4') and LT-G-030 (0-2') were analyzed for VOCs.

Arsenic concentrations above 24 mg/kg were observed in several borings including LT-C-002, LT-C-003, LT-C-012, LT-C-022, LT-C-036, and LT-C-037. Lead concentrations above 400 mg/kg were not observed. Sampling intervals were biased towards these elevated detections.

Visual Petroleum Stained Soil Delineation

Historical investigations performed at the Site had not identified residual petroleum stained soils on Parcel Upper C. However, visual petroleum stained soils were observed at LT-G-030. Elevated PID readings were also observed at LT-C-002, but there were no signs of visual petroleum staining. A map depicting the location of visually petroleum stained soils is included as **Figure 9**.

Analytical Summary

VOC were detected above MDLs in the soil samples analyzed. The detected compounds were below NYSDEC RRSCOs. The detected compounds are commonly associated with petroleum products. Given the compounds and concentrations observed, the petroleum appears to be fairly weathered.

Several SVOCs were detected above their respective NYSDEC RRSCOs in the 0 to 2 soil interval from LT-C-018. No other SVOCs were detected above NYSDEC RRSCOs in Parcel Upper C. Detections above NYSDEC RRSCOs for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 10A, B,** and **C.**

Arsenic was detected above the SWCL value of 24 mg/kg in five samples in Parcel Upper C. Four of the detections were in the 0 to 2 foot interval beneath the Dickson warehouse and the other detection was in the 2 to 4 foot interval from LT-C-040 (North of Benbow building). The highest concentration of arsenic (104 mg/kg) was observed at the 0 to 2 foot interval in LT-C-008. Detections above the SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 11A, B,** and **C.**

In addition to arsenic, manganese was detected above its respective NYSDEC RRSCO (2,000 mg/kg) in one sample, LT-G-036 (6-8') at 3,700 mg/kg.

Pesticides were not detected above NYSDEC RRSCOs in Parcel Upper C.

Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in each of the five soil samples. The detected concentrations were fairly uniform and consistent with the detections across all of the Li Tungsten parcels. **Figure 8** shows the locations of radiological confirmation samples and the Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.9 *Li Tungsten Site Characterization – Parcel C'*

Twelve soil borings were installed on Parcel C' as shown on **Figure 7A**. A description of the borings is detailed below:

- LT-C-062 through LT-C-068 and LT-C-070 through LT-C-074. These twelve soil borings were installed to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7A** as a pink circle with a cross.

In general, soils were characterized as medium to fine sands with silt and trace gravel overlain by clay layers. Construction related debris (brick, concrete, cobble, wood) were not observed in the soil cores. Saturated soils indicating the groundwater table were encountered at approximately 10 feet bgs in the southern portion of the Parcel and increased with depth to the north due to surface topography.

Soil Screening Results

Radiological exceedances above two times background were not detected for the samples throughout Parcel C'. There is no historical information for Parcel C'. In order to provide insurance data gap coverage and confirm radiological screening levels, four soil samples from four boring locations were collected and analyzed for radiological confirmation.

Elevated PID readings, arsenic concentrations above 24 mg/kg and lead concentrations above 400 mg/kg were not observed. VOC sampling was not performed based upon screening levels observed.

Analytical Summary

SVOCs, metals, and pesticides were not detected above either SWCLs or NYSDEC RRSCOs.

Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in each of the four soil samples. The detected concentrations were fairly uniform and consistent with the detections across all of the Li Tungsten parcels. **Figure 8** shows the locations of radiological confirmation samples and the Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels.

Soil analytical results are summarized in **Tables 2** through **7** and complete laboratory analytical reports are included in **Appendix H**.

5.6.10 *Captain's Cove Site Characterization*

Fifty-five soil borings and two tests pits were installed on Captain's Cove as shown on **Figure 7C**. A description of the borings is detailed below:

- CC-C-001 through CC-C-051: These fifty-one soil borings were installed to provide confirmation/insurance data gap coverage. Borings are identified on **Figure 7C** as a pink circle with a cross.
- CC-GI-001 and CC-GI-002: These two test pits were performed to investigate anomalies identified during the geophysical survey as well as provide confirmation/insurance data gap coverage. Test pits are identified on **Figure 7C** as a blue circle.
- CC-GTBH-001 through CC-GTBH-004. These four soil borings were installed ahead of the geotechnical borings to pre-screen and clear each location. Based upon results from CC-C-001 through CC-C-051, soil samples were collected and analyzed for SVOCs, arsenic, copper, lead, nickel, and mercury to further

delineate the horizontal and vertical extent of these constituents. Borings are identified on **Figure 7C** as a blue square with a cross.

In general, soils were characterized as medium to fine sands with silt and trace gravel overlain by clay and bog layers. Construction related debris (brick, concrete, cobble, wood) were detected throughout the site. Saturated soils indicating the groundwater table were encountered between 4 feet bgs near the bulkhead and increased towards the north to 10 feet bgs.

Soil Screening Results

Radiological exceedances above two times background were not detected for the samples throughout Parcel A. Based upon available information, the USEPA remedial area for radionuclides took place on the western portion of Captains Cove and the area that is now identified as the Ferry Terminal. There was no documentation of disposal of radioactive material on other portions of the site. In order to confirm remedial endpoint results and confirm radiological screening levels, seven soil samples were collected and analyzed for radiological confirmation in the vicinity of the USEPA remedial area to the west and one soil sample to the east where there was no historical radiological detections. The Ferry Terminal was not a part of this investigation.

Elevated PID readings were observed in several borings including CC-C-010, CC-C-012, CC-C-026, and CC-C-051. The highest screening results were observed at CC-C-051. Based on the screening results, CC-C-051 (8-10'), located within the saturated soils, was analyzed for VOCs.

Arsenic concentrations above 24 mg/kg and lead concentrations above 400 mg/kg were observed in multiple borings and depth intervals throughout the site. Sampling intervals were biased towards these elevated detections.

Analytical Summary

VOC were detected above MDLs in the soil sample analyzed. The detected compounds were below NYSDEC RRSCOs. The detected compounds are commonly associated with petroleum products. Given the values observed, the petroleum appears to be fairly weathered and broken down.

SVOCs were detected above NYSDEC RRSCOs in several samples in Captains Cove. Compounds detected above NYSDEC RRSCOs included Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, and Ideno(1,2,3-cd)pyrene. These compounds are commonly associated with heavy petroleum products. The highest total SVOC concentrations were observed in the 4 to 6 foot interval from CC-C-009 at 431,480 mg/kg. Detections above NYSDEC RRSCOs for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 13A, B,** and **C.** As shown in the figures the majority of the detections above the water table were along the north and south portions of the site which may have been outside of the remedial areas performed by the NYSDEC and USEPA.

Arsenic was detected above the SWCL value of 24 mg/kg in multiple samples throughout Captains Cove. The detections of arsenic were scattered throughout the site and were detected at varying depth intervals. As

previously discussed, elevated concentrations of arsenic were observed and left in-place at the water table following the USEPA remediation. The highest concentration of arsenic (1,856 mg/kg) was observed at the 0 to 2 foot interval in CC-C-019. Detections above the SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 14A, B,** and **C.** As shown on the figures, there were more shallow detections towards the center of the site.

Lead was detected above the SWCL value of 400 mg/kg in multiple samples throughout Captains Cove. The detections of lead were scattered throughout the site and were detected at varying depth intervals. Shallow lead exceedances were biased towards the western portion of the site, intermediate lead exceedances were biased towards the southern and eastern portion of the site (likely outside remedial area), and deep lead exceedances were spread out throughout the site. The highest concentration of lead (6,030 mg/kg) was observed at the 6 to 8 foot interval in CC-C-023. Detections above the SWCL for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 15A, B,** and **C.**

Copper was detected above the NYSDEC RRSCO value of 270 mg/kg in multiple samples throughout Captains Cove. The detections of copper were scattered throughout the site and were detected at varying depth intervals. One copper exceedance was detected in the shallow interval on the western portion of the site, multiple copper exceedances were detected in the intermediate interval on the eastern portion of the site, and three copper exceedances were detected in the deep interval on the eastern edges. The highest concentration of copper (85,200 mg/kg) was observed at the 10 to 12 foot interval in CC-C-001. Detections above the NYSDEC RRSCO for the shallow interval (0 to 2 feet bgs), intermediate interval (2 to 6 feet bgs) and deep interval (6 to 12 feet bgs) are highlighted in **Figures 16A, B,** and **C.**

In addition to arsenic, copper and lead, there were several detections of barium, cadmium, nickel, and lead above NYSDEC RRSCOs throughout the site.

One pesticide, Dieldrin, was detected above its respective NYSDEC RRSCO (200 µg/kg) in the soil sample collected from CC-C-019 (0-2') at a concentration of 260 µg/kg. No other pesticides were detected above NYSDEC RRSCOs in Captains Cove.

Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels were below the SWCLs in each of the eight soil samples. The detected concentrations were fairly uniform across the site and similar to the levels observed on Li Tungsten. **Figure 8** shows the locations of radiological confirmation samples and the Thorium-230 + Thorium-232 and Radium-226 + Radium-228 levels.

Soil analytical results are summarized in **Tables 11** through **15** and complete laboratory analytical reports are included in **Appendix H**.

5.7 Groundwater Characterization

Historical reports have identified the presence of groundwater contamination beneath the Site. Historical reports have also documented groundwater contamination sources up-gradient of the Site that one can reasonably

conclude have caused the onsite detections. In order to verify current groundwater conditions at the Site, groundwater sampling was performed. A total of twenty-two samples were collected from across the Site. Groundwater sampling locations are identified in **Figure 17**.

5.7.1 *Historical Groundwater Sources*

There are several properties adjacent to the Site that contain environmental concerns that have been documented to affect groundwater beneath the Site.

The Mattiace Petrochemical Federal Superfund Site is located on Garvies' Point Road. Li Tungsten Parcel C' borders the site to the north and the Angler's Club and Gladsky Site are located hydraulically down-gradient. Historical operations at the site were documented to have impacted soil and groundwater beneath the site. Remedial actions conducted include removal of impacted soil and installation of a pump and treat system to remediate groundwater. Recent groundwater sampling events have shown elevated concentrations of tetrachloroethene (PCE), trichloroethene (TCE), ethylbenzene, and xylenes both onsite and offsite to the west and south.

The Crown Dykman Site is located on Herb Hill Road. Li Tungsten Parcel B borders the site to the west and Parcel A borders the site to the south. Historical operations at the site were documented to have impacted soil and groundwater beneath the site. Remedial actions conducted include removal of impacted soils and implementation of a groundwater monitoring program. Recent groundwater sampling events have shown elevated concentrations of PCE, TCE, cis-1,2-dichloroethene (DCE), and vinyl chloride both onsite and offsite to the west and south.

The Konika Minolta Site, also known as the former Columbia Ribbon and Carbon Manufacturing Company disposal site / Powers Chemco Site, is located on Charles Street. Li Tungsten Parcel B borders the site to the west and Parcel A is hydraulically down-gradient. Historical operations at the site were documented to have impacted soil and groundwater beneath the site. Remedial actions conducted include removal of impacted soil and installation of a pump and treat system to remediate groundwater. Groundwater sampling events have shown elevated concentrations of toluene, ethylbenzene, and xylenes contained onsite.

5.7.2 *Groundwater Sampling Protocol*

Following the completion of the soil borings identified in **Figure 17**, AES advanced a four foot long screen point sampler to three feet below the water table. This allowed the sampler screen to intersect the water table. The depth to water was estimated based upon observations of saturated soils in the borings. Disposable polyethylene tubing was inserted into the water bearing zone of the sampler. The end of the tubing was connected to a peristaltic pump with dedicated silicone tubing. Four casing volumes of water were purged from the temporary well prior to the collection of samples. During purging, the groundwater parameters pH, temperature, turbidity, and conductivity were monitored utilizing a water quality meter. Copies of the groundwater sampling data sheets containing the field parameters recorded and purge volumes for each sampling point are included in **Appendix I**.

In addition, one existing groundwater monitoring well (GM-11), located on Parcel C', was sampled. Prior to collection of the sample, three casing volumes were evacuated (purged) from the well using a submersible pump. During purging, the groundwater parameters pH, temperature, turbidity, and conductivity were monitored utilizing a water quality meter. Copies of the groundwater sampling data sheets containing the field parameters recorded and purge volumes for each sampling point are included in **Appendix I**. The groundwater sample was collected using a disposable polyethylene bailer and a dedicated polyethylene line.

Groundwater samples were transferred to laboratory supplied glassware and packed in a cooler with ice and shipped under proper chain-of-custody procedures to Test America, a NYSDOH ELAP certified laboratory, for analysis individually following NYSDEC ASP - Category B Deliverables.

Groundwater samples were analyzed for the following:

- VOCs by USEPA Method 8260
- SVOCs by USEPA Method 8270
- TAL Metals by USEPA Method 6010/7471 (Total and Dissolved)
- Radium-226 by Method 903.0 (Performed on 25% of Samples)
- Radium-228 by Method 904.0 (Performed on 25% of Samples)
- Isotopic Thorium and Uranium (Alpha Spectrometry) by Method A-01-R (Performed on 25% of Samples)
- Cesium-137 & Other Gamma Emitters (Gamma Spectroscopy) by Method GA-01-R (Performed on 25% of Samples)

The radiological analysis was performed on the following five samples.

- LT-R-001, LT-R-002, LT-R-003: Radiological analysis was performed on these three locations in order to evaluate groundwater conditions which may be encountered during construction of the traffic circle which may include dewatering during construction.
- LT-C-054: Radiological analysis was performed at this location to collect data in between areas formerly sampled.
- CC-C-028: Radiological analysis was performed at this location as this area was remediated by the USEPA for radionuclides.

5.7.3 *Analytical Summary*

VOCs commonly associated with the industrial solvent PCE and its breakdown constituents (TCE, DCE, trans-1,2-dicloroethene, and vinyl chloride) were detected above AWQS in five of the twenty-two groundwater samples (LT-R-001, LT-R-002, LT-R-003, LT-XC-017, and LT-C-054). These five samples are located on the eastern portion of Parcel A and Parcel Lower C and in the road way between Parcel A and Parcel B. The highest detection was DCE at LT-R-001 (5,100 µg/l) which is located nearest the Crown Dykman site. The next highest concentration of DCE was at LT-C-054 (700 µg/l) which is located in the middle of Parcel A down-gradient of the Crown Dykman site. PCE was only detected at the two samples on Parcel Lower C at low concentrations. There are no historical sources or detections of these constituents in the site soils above the water table on Li Tungsten and it is

reasonable that these detections originated from the Crown Dykman site which has a documented plume migrating both west and south.

VOCs commonly associated with petroleum products were detected above AWQS in five of the twenty-two groundwater samples (LT-G-010, GL-GTBH-002, CC-C-030, CC-C-033, CC-C-051). A detection of benzene was observed in the sample collected from the northern section of Li Tungsten Parcel B. The detection was rather low and does not point to a significant source of impact and is reasonably attributed to the Konica Minolta site which has been documented to have petroleum impacts to the groundwater. Low level detections of ethylbenzene and xylenes were observed in the sample collected from the western portion of the Gladsky site. The detections were rather low and are likely attributed to the Mattiace site which has these compounds documented in their plume which is migrating to the south. Petroleum constituents were also detected on the western portion of Captain's Cove at three locations. Concentrations were observed to be the highest at CC-C-051 which is located on the western edge of the western retention basin. Concentrations were significantly reduced at the two locations on the southwest corner of the site. It is uncertain as to the source of petroleum contaminants in the groundwater at this location.

VOCs were not detected above AWQS in the samples collected from Parcel Upper C and Parcel C'. A map depicting the VOC concentrations is shown on **Figure 18**.

SVOCs were detected above AWQS in twelve of the twenty-two groundwater samples. SVOCs were detected in both up-gradient and down-gradient locations. In general, the concentrations were fairly low and do not point towards any significant source with the exception of the concentrations observed at CC-C-051. SVOCs concentrations at this location are indicative of heavy petroleum which is consistent with the elevated VOCs observed at this location. A map depicting the SVOC concentrations is shown on **Figure 19**.

Dissolved metals, not including the naturally occurring metals, were detected above AWQS in nine of the twenty-two groundwater samples. The detections were predominantly on the western portion of Captain's Cove, Parcel Lower C and the western portion of Parcel A. These metals included antimony, arsenic, cadmium, chromium, copper, nickel, selenium, and zinc. In general, these metals were detected in the soils at these locations from the saturated zone with the exception of selenium. Arsenic detections were limited to the western section of Captain's Cove where the USEPA left levels of arsenic in place in the saturated intervals. Parcel A and Parcel Lower C had elevated detections of metals in the saturated soils, higher than the rest of the site. There were no exceedances on Parcel B, Parcel Upper C, Parcel C' and Gladsky. A map depicting the dissolved metals concentrations is shown on **Figure 20**.

Several radiological isotopes were detected above MDLs in the five groundwater samples. In general, the detected isotopes were observed to be lowest in the groundwater sample collected from LT-R-001 and highest from LT-C-054. The initial results for groundwater were biased high as they were analyzed without using an in-growth period. For this analysis, the concentration of Radium-226 as well as the combined concentration of Radium-226 and Radium 228 exceeded its respective AWQS in LT-C-054, LT-R-002 and LT-R-003. The reason for this is that the results contain other alpha-emitting isotopes that may be present in the sample. Radium-223 and

Radium-224 are two other alpha-emitting isotopes that may contribute to the results. Radium-223 has an 11.4 day half-life, while Radium-224 has an 87.8 hour half-life. More confidence can be placed in the 21-day in-growth analysis which allows the short-lived isotopes to decay away.

The laboratory then analyzed LT-C-054 (GW), LT-R-002 (GW) and LT-R-003 (GW) after the 21 day in-growth period to establish a more accurate value for Radium-226. In this analysis Radium-226 values decreased from 11.6 pCi/l to 4.75 pCi/l in LT-C-054 (GW), 7.4 pCi/l to 1.27 pCi/l in LT-R-002 (GW) and from 3.53 pCi/l to 0.852 pCi/l in LT-R-003 (GW). These values represent Radium-226 without any interference and are within NYSDEC AWQS with the exception of LT-C-054.

As noted in the groundwater sampling logs, sample turbidity was high, which required the laboratory to reduce the volume of sample LT-C-054 to 250 mL and LT-R-002 to 500 mL because of the high amount of sediment. The result was the reduced sample volume added a bias that increased the reported results. The other sample volumes were not reduced. It is likely that if the LT-C-054 (GW) sample was not reduced, the value would be within AWQS.

Groundwater analytical results are summarized in **Tables 16** through **19** and complete laboratory analytical reports are included in **Appendix H**.

5.8 Quality Assurance/Quality Control

As stated in the Work Plan, the overall quality assurance/quality control (QA/QC) objective for the field investigation was to develop and implement procedures that provide data of known and documented quality. QA/QC characteristics for data include precision, accuracy, representativeness, completeness, and comparability. The purpose of the QA/QC activities developed for this site was to verify the integrity of the work performed at the site to assure that the data collected are of the appropriate type and quality needed for the intended use.

The QA/QC program included the preparation and analysis of field QA/QC samples such as field blanks, field duplicates, and matrix spike duplicates. Third party data validation was performed on 100 percent of the laboratory results.

5.8.1 *QA/QC Samples*

To assess the adequacy of sample collection and decontamination procedures performed in the field, QA/QC samples were collected and analyzed throughout the field sampling program. In general, QA/QC samples confirmed that the procedures performed in the field were consistent and acceptable. Reported detections in the equipment blanks did not impact the interpretation of sample data. As specified in the Work Plan, QA/QC samples collected for laboratory analysis included trip blanks (TB), equipment blanks (EB), blind/field duplicates (FD), matrix spike (MS), and matrix spike duplicates (MSD). The EB samples were collected daily for each sampling method that used disposable equipment such as the acetate liners and polyethylene tubing from the peristaltic pump. Equipment blanks were collected by pouring laboratory-supplied de-ionized water over sampling equipment and collecting the water in the appropriate sample container(s). FD and MS/MSD samples were

submitted at a minimum of one each per twenty samples.

Type	Frequency
Equipment Blank	One per day per sample matrix
Blind/Field Duplicate	One per 20 samples per matrix
Matrix Spike/Matrix Spike Duplicate	One per 20 samples per matrix
Trip Blanks	One per sample cooler with VOC samples present

A list of the QA/QC samples is included in **Appendix J**.

5.8.2 *Data Validation*

RXR Glen Isle Partners, LLC retained the services of Laboratory Data Consultants, Inc (LDC), of Carlsbad, California to perform validation of data obtained during the investigation. Full data validation was performed on 100% of the sample delivery groups. A copy of the Data Validation Report (DVR) is included as **Appendix K**.

5.8.3 *Data Usability Summary*

All data were deemed acceptable by the data validator, incorporating data qualifiers as appropriate with the exceptions of the rejected data points. Rejected compounds, which included several SVOCs in a few samples, were due to laboratory control issues relating to low recoveries from re-extraction analysis, inadequate recoveries of spiked compounds, detections above calibration range of instruments, and non-target interferences.

LDC narratives and the full data validation reports are provided in **Appendix K**. **Tables 2 - 19** were updated, as appropriate, based upon the data validator's review.

5.9 Investigative Derived Waste (IDW)

Two 55-gallon drums of liquids (one decontamination water and one purge water) and one 55-gallon drum of soils (soil samples that failed the screening criteria) were generated by the environmental driller during the investigation. A single stockpile of soil (soil interval that failed the screening criteria) from the test pits were generated by RGC. One hundred and four 55-gallon drums of bentonite slurry were generated by the geotechnical drilling contractor. The drums are currently being staged onsite and will be sampled and disposed of in accordance with local, state, and federal regulations.

5.10 Community Air Monitoring

The CAMP was performed daily during soil disturbance activities by PWGC. Dust and Volatile organic vapors were screened for periodically throughout the day around the surrounding area as detailed in the CAMP. Action levels established in the CAMP were not exceeded. Copies of all field data sheets relating to the CAMP are provided in electronic format in **Appendix E**.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The GI Waterfront Redevelopment Site consists of multiple properties located along Herb Hill and Garvies' Point Roads in Glen Cove, New York. The Pre-Construction Confirmation/Insurance Data Gap SI was performed to confirm the current subsurface conditions prior to construction and address environmental data gaps for purposes of characterizing the site for subsequent insurance coverage and as a condition of closing on the property. The SI included a geophysical survey and test pit investigation over the southeastern portion of the Captain's Cove site, the installation of 233 soil borings and eleven test pits, field screening of soils for volatile organic vapors, arsenic, lead, and radioactivity, analysis of 633 soil samples, and the collection and analysis of 23 groundwater samples. A summary of the findings by Site is detailed below.

6.1 Angler's Club / Gladsky

6.1.1 *Subsurface Soil Quality*

A total of two soil borings and four test pits were installed and ten soil samples analyzed to confirm the existing conditions and provide insurance data gap coverage for the two sites.

Soil quality on the two sites was observed to consist of fine sands with trace amounts of silt and gravel. Saturated soil indicating the groundwater table was encountered between 4 and 8 feet bgs. The findings identified SVOCs at concentrations in excess of site standards (Restricted-Residential Use) at one shallow location on Gladsky. This location is within the two feet of clean cover that was installed during remediation. VOCs, metals, pesticides and radiological compounds were within acceptable concentrations for Restricted-Residential Use.

6.1.2 *Groundwater Quality*

A total of two groundwater samples were collected from the Gladsky Site to evaluate groundwater quality. Groundwater flow direction has been documented to have both a southern and western flow component.

VOCs and SVOCs associated with heavy petroleum products were detected in the groundwater sample located down-gradient of the Mattiace Site. The Mattiace Site has both a petroleum and chlorinated VOC plume which has been documented to be migrating to the south. It appears that some of the petroleum constituents have migrated onto the site.

6.1.3 *Insurance Data Gap Evaluation*

The investigation fulfilled the data gap for the Angler's Club and one of the two data gaps for the Gladsky Site. The investigation did not include sampling and analysis of creek sediments which may be disturbed or removed during bulkhead work or dredging which is an insurance data gap for the Gladsky Site. Creek sediments will be evaluated in a separate investigation.

Soil quality levels are acceptable for Restricted-Residential Use on Angler's Club and beneath the demarcation membrane on Gladsky. SVOCs above RRSCOs were detected in one of the two samples collected within the two

feet of clean cover material installed at the Gladsky site. Additional evaluation of the clean cover material may be warranted to further characterize the material.

Groundwater contamination was observed and the SMP guidance will need to be followed for dewatering.

6.2 Li Tungsten

A total of 176 soil borings and five test pits were installed and 463 soil samples analyzed to confirm the existing conditions and provide data gap coverage for the site which includes Parcel A, Parcel B, Parcel Lower C, Parcel Upper C, Parcel C', Dickson Street, and Garvies' Point Road. The findings identified the presence of SVOCs, metals, pesticides, and PCBs (PCB analysis was limited to Parcel B) at concentrations in excess of site standards (Restricted-Residential Use). VOCs and radiological compounds were within acceptable concentrations for Restricted-Residential Use.

6.2.1 *Subsurface Soil Quality – Parcel A*

Soil quality on Parcel A was observed to consist of medium to fine sands with silt and trace gravel overlain by clay and bog layers. Construction related debris (brick, concrete, cobble, wood) were detected throughout the parcel. Saturated soils indicating the groundwater was encountered between 2 feet bgs near the bulkhead and increased towards the north to 8 feet bgs. Analytical results identified metals (predominantly arsenic with sporadic detections of cadmium, copper, lead, mercury, and manganese) and SVOC concentrations in excess of site standards throughout the majority of the parcel mostly in the 0-6 foot depths, but also at some locations greater than 12 feet bgs. Arsenic and SVOC concentrations were fairly uniform across the parcel with the exception of total SVOC concentrations (339,790 µg/kg) in the shallow unsaturated interval from LT-C-030. One pesticide (Dieldrin) was also detected in excess of site standards at one shallow location.

6.2.2 *Insurance Data Gap Evaluation – Parcel A*

The investigation provided adequate coverage of the parcel and fulfilled the data gap for Li Tungsten Parcel A with the exception of the soil underlying the Lounge Building, which will be filled once demolition is complete. Soil quality could not be evaluated beneath the Lounge Building during this investigation. PWGC recommends evaluating soil quality beneath the building after demolition is complete, thereby, fulfilling the data gap analysis for Li Tungsten Parcel A.

SVOC content was found above RRSCOs. EPA did not have an SWCL for SVOCs but did address them in its risk assessment. Arsenic and, to a lesser extent, lead were found aerially and vertically exceeding the USEPA SWCLs sporadically throughout the parcel. Other metals and/or pesticides exceeding the RRSCOs were also found.

6.2.3 *Subsurface Soil Quality – Parcel B*

Soil quality on Parcel B was observed to consist of medium to fine sands with silt and trace gravel overlain by clay. Saturated soils indicating the groundwater table were encountered at approximately 6 feet bgs in the southern portion of the Parcel and increased with depth to greater than 12 feet bgs to the north due to surface topography. Analytical results identified PCB concentrations in excess of site standards in the shallow interval from

the eastern portion of the parcel. PCB concentrations were fairly uniform across the parcel with the exception of Aroclor1248 (190,000 µg/kg) in the shallow unsaturated interval from LT-XC-007. Two pesticides (Aldrin and Dieldrin) and Cadmium were detected in excess of site standards in the shallow interval at two separate locations.

6.2.4 *Insurance Data Gap Evaluation – Parcel B*

The investigation provided adequate coverage of the parcel and fulfilled the data gap for Li Tungsten Parcel B.

PCB concentrations above surface soil SWCLs were confirmed to be present at the concentration reported in the FSSR on the eastern portion of Parcel B as previously documented with the exception of location LT-XC-007 where the content was higher than previously documented. Arsenic and lead concentrations were not observed to be in excess of SWCLs as previously documented as a single hot spot. Isolated pesticides and cadmium levels above RRSCOs were identified on Parcel B which was not previously documented.

6.2.5 *Subsurface Soil Quality – Parcel Lower C*

Soil quality on Parcel Lower C was observed to consist of medium to fine sands with silt and trace gravel overlain by clay and bog layers. Saturated soil indicating the groundwater table was encountered between 6 and 8 feet bgs. Analytical results identified metals (predominantly arsenic with sporadic detections of cadmium, copper, and lead) and SVOCs concentrations in excess of site standards throughout the majority of the parcel from surface grade to greater than 12 feet bgs. Arsenic and SVOC concentrations were fairly uniform across the parcel. A detection of lead (4,480 mg/kg) in the intermediate unsaturated interval from LT-C-024 was significantly higher than detections observed throughout the GI Site.

6.2.6 *Insurance Data Gap Evaluation – Parcel Lower C*

The investigation provided adequate coverage of the parcel and fulfilled the data gap for Li Tungsten Parcel Lower C.

Visual petroleum impact was confirmed in the vicinity of the former AST base. Analytical results indicate the material is weathered. Arsenic and lead concentrations above RRSCOs were confirmed to be present on Parcel Lower C. The horizontal and vertical extent was found to be greater than previously documented (not contained to exempt area EA-3) and included SVOCs and/or metals in exceedance of RRSCOs in the unsaturated soils throughout the parcel.

6.2.7 *Subsurface Soil Quality – Parcel Upper C*

Soil quality on Parcel Upper C was observed to consist of medium to fine sands with silt and trace gravels underlain by clayey sands. Saturated soils indicating the groundwater table were encountered at approximately 6 feet bgs in the southern portion of the Parcel and increased with depth greater than 12 feet bgs to the north due to surface topography. Analytical results identified arsenic concentrations in excess of site standards in several of the shallow unsaturated soils beneath the Dickson Warehouse. In addition, SVOCs in one shallow

sample, arsenic in one intermediate sample, and Manganese in one deep sample were in excess of site standards.

6.2.8 *Insurance Data Gap Evaluation – Parcel Upper C*

The investigation provided adequate coverage of the parcel with the exception of the soil underlying the Lounge Building, which will be filled once demolition is complete and fulfilled the data gap for Li Tungsten Parcel Upper C that showed the detected chemicals were within the range reported in the closure document. Soil quality could not be evaluated beneath the Benbow Building during this investigation. PWGC recommends evaluating soil quality beneath the building after demolition is complete, thereby fulfilling the data gap analysis for Li Tungsten Parcel Upper C in full.

Radiological screening and analysis did not confirm the radionuclides previously identified in the FSSR adjacent to the Benbow Building. Arsenic concentrations were not observed to be in excess of SWCLs as previously documented as a single hot spot west of the Dickson Warehouse. However, arsenic levels were documented in the shallow soils beneath the Dickson Warehouse above SWCLs. The soil data from beneath the Dickson Warehouse fills a data gap.

6.2.9 *Subsurface Soil Quality – Parcel C'*

Soil quality on Parcel C' was observed to consist of medium to fine sands with silt and trace gravels underlain by clay layers. Saturated soil indicating the groundwater table was encountered at approximately 10 feet bgs in the southern portion of the Parcel and increased with depth to the north due to surface topography. Analytical results were within acceptable levels for Restricted-Residential Use.

6.2.10 *Insurance Data Gap Evaluation – Parcel C'*

The investigation fulfilled the data gap evaluation for Parcel C' and characterized the site as acceptable for Restricted-Residential Use. No further evaluation is recommended.

6.2.11 *Groundwater Quality*

A total of 13 groundwater samples were collected from throughout the Li Tungsten Site to evaluate groundwater quality. Groundwater flow direction has been documented to have both a southern and western flow component.

VOCs commonly associated with PCE and its breakdown constituents were detected above AWQS on Parcel A and Parcel Lower C. The highest detections were observed nearest the Crown Dykman site and reduced in concentration in the down-gradient samples which were further away from the suspected source. There is no documented usage of PCE onsite and these compounds were not observed in the unsaturated soil VOC samples analyzed during this investigation. PCE concentrations were detected at estimated low levels, well below SCOs, in the unsaturated soil samples collected and analyzed during the Remedial Investigation performed at the site. The detections were limited to the vicinity of Parcel A and B that border the former Crown Dykman Site and the southern section of Parcel Lower C. The concentrations are not representative of a source or surface spill and

may be attributed to off-gassing of PCE from the groundwater as the samples were near the groundwater table. In addition, a minor detection of benzene above AWQS was detected on Parcel A. There were no detections on Parcel Upper C or C'.

SVOCs and dissolved metals were detected in groundwater samples sporadically throughout the site. These compounds were also detected in the saturated soil in the same vicinity as the groundwater detections. The SVOC detections except for Parcel Upper C are likely attributed to SVOCs in the surrounding soil that may have been in the suspended sediment in the samples as SVOCs have low solubility in groundwater. Only Bis-(2-ethylhexyl)phthalate, a frequently detected chemical associated with plastic products, was found in Upper C and this isn't attributed to an onsite source as this Parcel had only one SVOC detection in the shallow unsaturated zone and no detections in the intermediate and deep zones. Radiological compounds were within AWQS with the exception of the sample collected from Parcel A which was elevated due to a reduction in sample volume due to heavy turbidity.

6.2.12 *Insurance Data Gap Evaluation: Groundwater*

This investigation fulfilled the data gap evaluation for groundwater and documented that groundwater quality is as presented in the remedial action closure reports and no sources of VOC groundwater contamination exist onsite. Evidence of offsite sources was confirmed from the Crown Dykman and Mattiace properties.

6.3 Captain's Cove

6.3.1 *Geophysical Investigation*

The geophysical survey identified two conductive areas in the southeastern section of the site. GPR profiles were inconclusive over the two areas. Test pits were performed in these areas to investigate further and were found to contain construction debris including metal pipes and large pieces of concrete. Intact building foundations were not encountered.

6.3.2 *Subsurface Soil Quality*

A total of 55 soil borings and two test pits were installed and 160 soil samples analyzed to confirm the existing conditions and provide data gap coverage for the site. The findings identified the presence of SVOCs, metals, and pesticides concentrations in excess of site standards (Restricted-Residential Use). VOCs and radiological compounds were within acceptable concentrations for Restricted-Residential Use.

Soil quality was observed to consist of medium to fine sands with silt and trace gravel overlain by clay and bog layers. Construction related debris (brick, concrete, cobble, wood) was detected throughout the site. Saturated soil indicating the groundwater table was encountered between 4 feet bgs near the bulkhead and increased towards the north to 10 feet bgs. Analytical results identified metals (predominantly arsenic, copper and lead with sporadic detections of barium, cadmium, mercury, and Nickel) and SVOC concentrations in excess of site standards throughout the majority of the parcel from surface grade to greater than 12 feet bgs. Arsenic, copper, lead and SVOC concentrations were fairly uniform across the parcel with the exception of arsenic (1,856 mg/kg) in the shallow unsaturated interval from CC-C-019, copper (85,200 mg/kg) in the deep saturated interval from CC-

C-001, and lead (6,030 mg/kg) in the deep saturated interval from CC-C-023. One pesticide (Dieldrin) was also detected in excess of site standards at one shallow location.

6.3.3 *Insurance Data Gap Evaluation*

The investigation provided adequate coverage of the site and fulfilled three of the four data gaps, the fourth being the creek sediments in the area of the proposed Long Boat Marina. The investigation did not include sampling and analysis of creek sediments which may be dredged for construction of a boat dock. Creek sediments will be evaluated in a separate investigation.

Excavated soil used as backfill during both the USEPA and NYSDEC remediation was determined to contain SVOCs, metals, and/or pesticides above either SWCLs or RRSCOs. When compared to the cleanup standards in the ROD and the documented levels left in place beneath the water table, there were a few arsenic and lead hot spots that exceed levels previously documented. Radiocative screening and analysis did not identify any radionuclides across the site including near the south corner of the west retention pond where creek sediments were used as backfill. In addition, SVOCs and metals were determined to be in excess of either SWCLs or RRSCOs in soils not remediated by either the NYSDEC or USEPA.

6.3.4 *Groundwater Quality*

A total of seven groundwater samples were collected from throughout the Site to evaluate groundwater quality. Groundwater flow direction has been documented to have both a southern and western flow component.

VOCs and SVOCs associated with heavy petroleum products were detected at high concentrations at CC-C-051 which is located near the western retention pond. Low levels of VOCs and SVOCs were observed in the saturated soil sample collected from this location. Staining was not observed in the soil boring, however a petroleum odor was present at the saturated zone. Concentrations were reduced in the down-gradient groundwater samples. Further evaluation of the elevated petroleum VOCs and SVOCs is recommended to determine the source.

Dissolved metals were detected throughout the site. These compounds were also detected in the saturated soils at the site. Radiological compounds were within AWQS.

6.3.5 *Insurance Data Gap Evaluation: Groundwater*

This investigation fulfilled the data gap evaluation for groundwater and documented that except for one sample at CC-C-051 groundwater quality is as presented in the remedial action completion reports.

7.0 REFERENCES

Dvirka and Bartilucci Consulting Engineers (DNB), Site Management Plan Captains Cove Site; June 2010.

DNB, Draft Site Management Plan Li Tungsten Site; May 2012.

NYSDEC, Division of Environmental Restoration, 6 NYCRR Part 375 Subpart 6, Remedial Program Soil Cleanup Objectives; December 14, 2006.

NYSDEC, Division of Environmental Remediation, DER-10, Technical Guidance for Site Investigation and Remediation; May 2010.

NYSDEC, Division of Environmental Remediation, CP-51 / Soil Cleanup Guidance; October 21, 2010.

NYSDEC, Division of Water, Technical and Operational Guidance Series 1:1:1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations; June 1998, Addendum April 2000.

PWGC, Environmental Condition Report – Glen Isle Waterfront Revitalization Project; May 22, 2009.

PWGC, Pre-Construction Confirmatory / Data Gap Subsurface Investigation Work Plan; December 2013.

USEPA, Explanation of Significant Differences – Li Tungsten Corporation Superfund Site; November 2002.

USEPA, Explanation of Significant Differences – Li Tungsten Corporation Superfund Site; May 2005.

USEPA, Record of Decision – Li Tungsten Corporation Superfund Site; September 30, 1999.

USEPA, Record of Decision – Li Tungsten Corporation Superfund Site Operable Unit Four – Glen Cove Creek; March 30, 2005.

FIGURES

TABLES

APPENDIX A

PRE-CONSTRUCTION CONFIRMATORY / DATA GAP SUBSURFACE INVESTIGATION WORK PLAN

APPENDIX B

GEOPHYSICAL INVESTIGATION REPORT

APPENDIX C

FIELD MONITORING EQUIPMENT – DAILY CALIBRATION LOGS

APPENDIX D

PRE-CLEARING SCREENING & MONITORING PROCEDURES / REGULATORY CORRESPONDENCE

APPENDIX E

COMMUNITY AIR MONITORING LOGS

APPENDIX F

TEST PIT LOGS

APPENDIX G

SOIL BORING LOGS

APPENDIX H

LABORATORY ANALYTICAL REPORTS

APPENDIX I

GROUNDWATER SAMPLING LOGS

APPENDIX J

SAMPLE IDENTIFICATION LOGS

PWGC
Strategic Environmental Engineering Solutions

APPENDIX K

DATA VALIDATION REPORT